FOUNDRY TRADE JOURNAL
Established 1902
WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

Vol. 84 Thursday, February 26, 1948 No. 1643

49, Wellington Street, London, W.C.2
'Grams: "Zacatecas, Rand, London"
'Phone: Temple Bar 3951 (Private Branch Exchange)
PUBLISHED WEEKLY: 21s. per annum (Home and Overseas)

The 1946 Factory Report

We congratulate Mr. G. P. Barnett on his first Report as Chief Inspector of Factories. As are all enlightened foundrymen, he is obviously anxious to eradicate the "slum" factory from the British manufacturing set-up. He finds himself in exactly the same position as the average manufacturer, that is, he is suffering from frustration owing to the activities (or should it be inactivities?) of other Government departments. He cites as an example the case of a factory planned for demolition just after the last war. The owners have been warned not to spend money on repairs during all these years, and, moreover, the plan only exists still on paper. "Is it surprising," the chief inspector asks, "in such circumstances that progressive deterioration has often occurred and that, with structural dilapidations increasing, occupiers eventually show increasing lack of care even for proper standards of cleanliness and good housekeeping within the factory?" Conditions would not be ameliorated by the evacuation of this type of factory by the present owners, because such is the demand for manufacturing premises of any type that prospective tenants would queue up to pay exorbitant key money.

A main activity of the Factory Department is to reduce accidents and to decrease the incidence of industrial diseases. The new chief must feel some satisfaction that in his first report he could point to an overall accident reduction of 7 per cent. As to industrial diseases, the position was much about the same, except that there was a distinct diminution in carbon-monoxide poisoning. Lead poisoning, at one time an industrial scourge, has been commendably reduced; in 1900 there were over 1,000 cases, whilst in 1946 only 47. In vitreous enamelling there has only been one case, this, unfortunately, a fatal one, since 1943. The Report on ironfoundries is meticulously fair. The industry is advised to mechanise wherever it takes the "donkey work" out of production, and generously to implement the Factory Acts as to ventilation. The foundries in the Midlands are commended for the progress they have shown, but the only remedy suggested for some of the little jobbing shops is complete rebuilding. We might add that most of them would welcome the chance.

The Report shows that in metal founding there were 13,225 accidents reported, of which 31 were fatal, including one young boy and a girl. The figures for 1945 were 11,947, with 36 fatalities. The growth was no doubt due to the recruitment of fresh labour and return of ex-Service men. As usual, there were about 1,400 accidents due to falling bodies. This figure always intrigues us, for we feel that, of all types, this surely is the most easily preventable through the exercise of reasonable care.

These Factory Reports are extremely valuable documents, but their usefulness would be increased by prompt publication. Until recently they were presented in the August following the year covered; now there is more than a twelve months' delay. The trade unions, through their international associations, could do much good for humanity in general (and, incidentally, remove a serious handicap to British commercial interests) by interesting their foreign colleagues to such an extent that all countries would not only have factory legislation similar to ours, but that these laws would be obeyed. If they require evidence, they will find much of interest in the B.I.O.S. and similar reports. Up to now, it has been the enlightened manufacturer who has given a lead. He has shown the advantages of some developments or conditions and then the Factory Inspectorate has, through legislation, made the rest of industry follow the lead. We ask the British trade unions to act in the international field as the enlightened employers have acted at home.

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The French System of Standardising Moulding Boxes

Though the French system still requires finalising, sufficient has now been done to show the basis.

Machine Moulding.—The specification for machine moulding boxes covers rectangular, square and round boxes varying in size from 10 in. to 6 ft. 8 in. One pinhole must be made oval. Plan dimensions for all three shapes are set out by the simple method of listing the dimension at the top and the side of a square and cross hatching those to be standardised. By this means they have covered 10 sizes each of rounds and squares and 47 of the rectangular variety. For depth, a similar system has been allowed, but each cross hatched square carries a number indicating the recommended dimensions. Thus a 10-in. box is to be 2½ in., whilst the 6-ft. 8-in. is 10 in. deep. A third table details against the major length, the distance between the centre of the pinholes (giving a plus or minus tolerance of half a millimetre); the diameter of the hole, a dimension for the slot; and the diameter of the pin. The two faces of the box are to be machined and boxes can be made from cast iron, malleable iron, steel castings, rolled steel or light alloys (according to potentialities and dimensions).

Hand Moulding.—Hand moulding is similarly dealt with, but the range covered is from about one foot square or round up to virtually 17 ft. Depths are dealt with as before. One of the faces of the cope and drag parts and both faces of mid-parts should be machined. The materials which can be used are the same as for machine moulding. Data for pinholes and pins are omitted.

The editor warmly thanks the *Centre Technique* for supplying copies of these two provisional specifications, which indicate a system capable of easily being emulated by the British authorities to the general advantage of the industry.

Scrap Iron

(*From our Scottish Representative*)

It has become fairly obvious that the drastic scrapping of five of our older battleships and a number of cruisers was not really due to their being obsolete. The real reason was our desperate shortage of scrap metal, which is endangering the steel industry's vital production programme. It needs a million tons this year, and that quantity was scheduled to come from our zone in Germany—not as reparations, but for payment. Now it emerges we are not getting a tenth part of the estimated figure. The Germans are putting their own interests first and deliberately obstructing deliveries of scrap steel. It cost Britain £80,000,000 last year to keep Western Germany alive. Our fleet is so dismantled that not a major British warship is available to show the flag in some vital foreign waters. Yet we are driven to sacrifice famous battleships for scrap iron Germany should supply. Need the fruits of victory be as bitter as this? It is now known that, having decided to scrap these battleships, there is difficulty in finding suitable berths for their dismantling.

Forthcoming Events

(Secretaries are invited to send in notices of meetings, etc., for inclusion in this column.)

MARCH 1.

Institute of Metals.

London Section:—"The Manufacture and Usage of Magnesium and its Alloys," by Major C. J. P. Ball, D.S.O., M.C., at the rooms of the Chemical Society, Burlington House, Piccadilly, London, W.1, at 6.30 p.m. (Joint Meeting with the London Section of the Society of the Chemical Industry).

MARCH 3.

Institution of Works Managers.

London Branch:—Half-day Conference, "Industrial Discipline and Incentives." Speakers: W. B. D. Brown (Glacier Metal Company, Limited), and A. K. Rice (Industrial Welfare Society), at 12.30 p.m., at the Waldorf Hotel, Aldwych, London, W.C.2.

Institution of Production Engineers.

Preston Section:—"Control of Overhead Costs," by T. G. Rose, M.I.Mech.E., at the Harris Institute, Corporation Street, Preston, at 7.15 p.m.

Royal Statistical Society—Industrial Applications Section

Birmingham Group:—"A Statistical Case Book," by A. Shaw, in the Chamber of Commerce, 95, New Street, Birmingham, 2, at 6.30 p.m.

MARCH 4.

Leeds Metallurgical Society

"Gas Turbine Applications in Iron and Steel Works," by Dr. A. T. Bowden (Joint Meeting with the Engineers' Group, The Iron and Steel Institute), at 7 p.m., at the Chemistry Dept., the University, Leeds.

The Institute of Metals.

Birmingham Section:—"Precision Casting," by F. Hudson, at the James Watt Memorial Institute, Great Charles Street, Birmingham, at 6.30 p.m.

MARCH 5.

Institution of Production Engineers

Eastern Counties Section:—Annual General Meeting at 6.30 p.m., at the Lecture Hall, Electric House, Ipswich, followed by "Some Measurements of British and American Industrial Efficiency," by L. C. Ord.

MARCH 6.

Institute of British Foundrymen

Bristol and West of England Branch:—"Loam and Dry Sand Moulding," by D. Robertson, at the Rougemont Hotel, Exeter, at 3 p.m.

West Riding of Yorkshire Branch:—"Brains Trust." A selected panel of Members will answer questions, at the Technical College, Bradford, at 6.30 p.m.

Keighley Association of Engineers.

Annual Dinner at the Assembly Hall, Mechanics Institute, Keighley, at 5.30 for 6 p.m.

Examinations for Metallurgists

The next examinations for the Licentiateship and Associateship of the Institution of Metallurgists will be held in September, 1948. Candidates must submit their applications for permission to enter at any time before April 1, 1948. Each application must be made on a form to be obtained from the Registrar, Institution of Metallurgists, 4, Grosvenor Gardens, London, S.W.1, and must be accompanied by a registration fee of one guinea. The remainder of the examination fee will be payable not later than August 1, 1948, by candidates whose applications to enter for the examination are accepted. The registration fee will not be returnable in any circumstances. Applications received after April 1, 1948, will not be considered. The Examination begins September 6.

The Development of Foundry Sand Control*

By G. L. Harbach

Introduction

It is well known that the standard of living depends on the success or failure of the export drive and that castings are an important item of these exports, but there is a shortage of castings and a shortage of foundry personnel to make them. If industry is to obtain all the castings it needs, increased production per man-hour is the only answer, and that entails using mechanical aids as much as possible to ensure that the available man-power and moulding skill are used to the best advantage.

The usual process of development is along the following lines:—(1) Moulding machines to increase output; (2) conveyors to transport the moulds; (3) sand delivered from hoppers; (4) pouring from ladles instead of hand shanks, and (5) green-sand moulding to replace dry-sand moulding whenever possible.

The Author has gone through all these stages during the past three years, with a certain amount of teething troubles, particularly as regards choice of sand and the control of its properties. The production per man-hour has increased three to four times and, as many foundries are likely to develop along similar lines and meet similar difficulties in the drive to increase production, it was felt that a Paper dealing with the problems encountered and settled, might prove helpful to others. The full title of the Paper should be, therefore, "The Development and Control of Green Moulding Sand for a Mechanised Grey Iron Foundry," and the purpose of this Paper is to discuss various problems relating to the sand used and the solution of those problems.

The developments occurred in a series of stages:—(1) Brassfoundry power rammed moulds scabbed due to sand of low permeability; (2) study of the theory of fitting-in of sand grains and its application in developing a more permeable sand for the first moulding machine; (3) general considerations regarding sand properties and restoration of losses occurring during casting and knocking out; (4) the selection of a permeable sand suitable for small grey-iron castings made in a mechanised section; (5) the selection of a stronger but still permeable sand as the casting size increased, and (6) the choice of a suitable coal dust.

First Stage in Mechanisation

The general work undertaken was medium to heavy grey iron and bronze castings, mainly made in dry sand and loam, with a little green sand work made from loose patterns and on hand-rammed machines. The shops had used Mansfield sand throughout for many years with satisfaction, for, due to the high clay content, it gave ample green and dry strength. Owing to the fine grain, it gave an excellent surface finish to the castings and, being local, it was cheap in transport costs—the disadvantage of its being low in permeability had not caused any real concern owing to the methods of manufacture used.

Mechanisation was first introduced in the brassfoundry, where a moulding machine and conveyor track was installed to take the place of small loose pattern work. It had an output of about 1 ton of gunmetal castings per day and used its own sand heap of 4 to 5 tons.

When the standard sand was used on the power-rammed machine and the moulds cast green, there were many scabbed castings due to the sand being too close, although hand-rammed green-sand moulds had not previously shown this fault. The reason for this was: the difficulties had previously been overcome by the exercise of the moulder's skill—he could ram softly in places and vent where necessary—but with power-rammed moulds the exercise of skill is limited and in any case such care would detract from maximum production.

Determination of Sand Properties

The trouble experienced focused attention on the properties of sand, and for those unfamiliar with sand testing the following outlines the procedure for routine testing of prepared sands using A.F.A. methods and apparatus:—

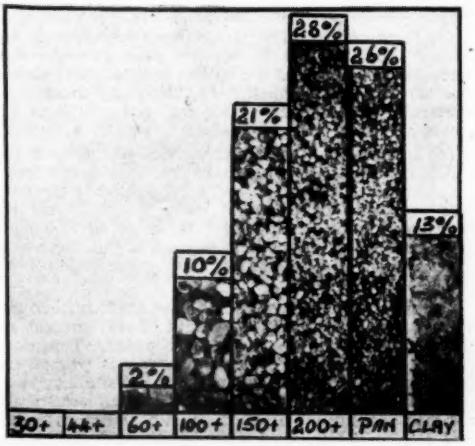

FIG. 1.—MANSFIELD SAND—SIEVE ANALYSIS AND GRAIN SHAPE.

* A Paper read before the East Midlands Branch, the Lincoln Section, and the Wales and Monmouth Branch of the Institute of British Foundrymen.

Development of Foundry Sand Control

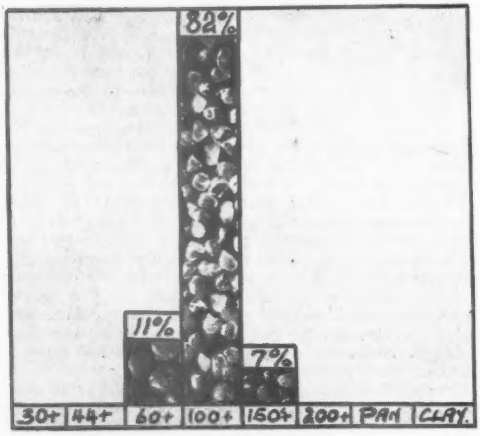

FIG. 2.—SOUTHPORT SEA SAND.

(1) *Moisture* in sand may be determined by loss in weight when dried at between 105 and 110 deg. C. or more rapidly by the "Speedy" moisture tester.

(2) *Green Strength* is obtained from a standard test-piece 2 in. dia. by 2 in. high, made by ramming under standard conditions, and measuring the load required to compress the test-piece to the point of collapse. The results are quoted in lbs. per sq. in.

(3) *Permeability.*—The same size of test-piece is used with an apparatus which forces a given quantity of air through the test-piece. From the time taken in seconds the permeability number is calculated by means of a factor—a low number of seconds giving a high permeability number and *vice versa.*

(4) *Shatter Test.*—This test has not yet been adopted officially, but a few foundries are finding the results obtained give valuable information regarding the cohesive properties of the sand. The standard test-piece is dropped from a height of 6 ft. on to an iron plate; the pieces which fail to pass through a ½-in. mesh sieve are weighed and calculated as a percentage of the original weight.

To assess the properties of a raw sand, further tests are made to determine the amount of clay present and the quantity and sizes of the sand grains. The procedure is as follows:—A weighed sample is washed free from clay; the sand grains are dried and the clay is determined by the loss in weight; the dried sand grains are then put through a set of sieves of varying standard meshes (see Table I) and, after 30 minutes' shaking, the amount on each sieve and the fines in the pan are weighed separately and calculated as percentages of the original sample weight.

TABLE I.—*Sieve Tests on a Raw Sand.*

B.S.I. sieve No.	Aperture, in.	A.F.A. factor.
8	0.0806	4
10	0.0658	5
16	0.0395	7.5
22	0.0275	15
30	0.0197	25
44	0.0139	35
60	0.0099	45
100	0.0060	70
150	0.0041	100
200	0.0030	140
300	0.0021	200
Pan	<0.0021	300

For the purposes of illustration and comparison of the sands mentioned, the results of the clay washing and sieve tests are shown in diagrammatic form (see Figs. 1 to 5), together with the relative sizes and shapes of the various grains.

In practice it is difficult to compare different sands by examining six, seven or eight sets of figures and, to simplify this, the sieve results may be combined into a single number known as the A.F.A. fineness number. The calculation is made by multiplying the percentage on each sieve and the pan by standard factors (see Table I) and dividing the total product by the total percentage sand grains, *i.e.*, 100 per cent. less the clay grade. The resultant number and the per cent. clay grade are a useful guide to compare similar sands (see Table II), but are not so effective for different types of sands, because the A.F.A. fineness number gives no indication of the "spread" of the grain sizes.

Properties Required

Reverting to the problem of scabbed castings, it became necessary to consider the properties required to give good results under the new moulding conditions and

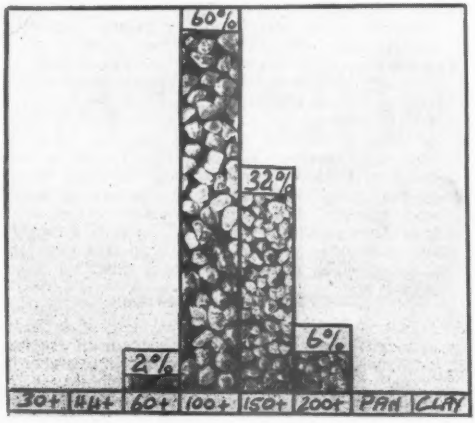

FIG. 3.—MINIMUM SILICA SAND.

TABLE II.—*A.F.A. Fineness Numbers of British Sands.*

Sand.	A.F.A. fineness No.	Clay grade, per cent.
Mansfield red	151	13
Bramcote red	91	8
Worksop red	120	11
Pickering yellow ..	105	19
Southport silica ..	69	Nil
Minimum silica ..	83	Nil

then find a sand to suit this purpose. With this end in view, many Papers on sands were studied and considerable thought given to the subject and, whilst some of the conclusions were elementary, they are recorded as showing steps in the development of sand control.

The chief properties required were:—(1) Green strength to take a good impression of the pattern and retain accurate mould shape during movement by hand, crane, or conveyor, and whilst pouring; (2) high permeability to enable steam and gases to escape easily when pouring metal into the mould; and (3) the ability to give a good casting finish. (Other properties are necessary in a moulding sand, but these were, and still remain, the three factors calling for the greatest attention.)

The strength depends on the clay content and the amount of water present; the permeability and casting finish depend chiefly on the sizes of the sand grains and how they pack together.

The Packing of Spheres

The normal procedure to open up a close sand is to use a coarse-grained sand, but, as this would have caused a poor casting finish, an alternative method was desired if possible, and this led to a consideration of the theory of permeability. The best guide to this subject

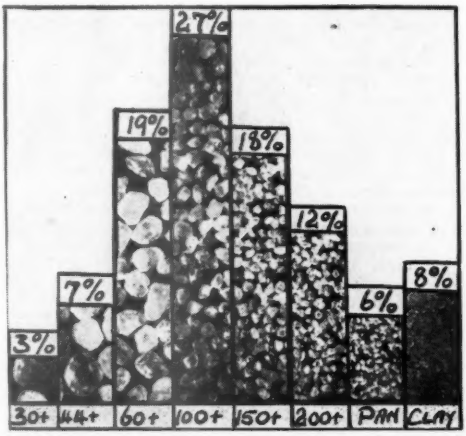

FIG. 4.—BRAMCOTE RED SAND.

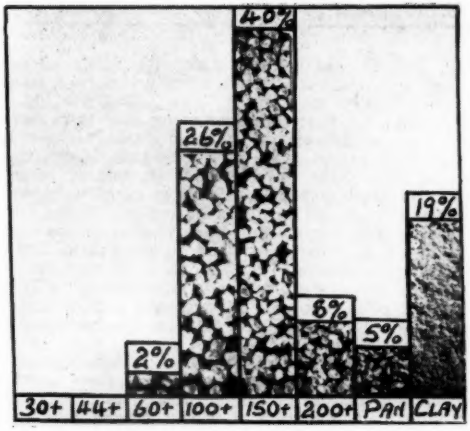

FIG. 5.—PICKERING MEDIUM YELLOW SAND.

was found in "Core Shop Control," by Sheehan, where he gave the product of a very detailed study of the packing of different sizes of sand grains and the effects on the sand properties.

Taking a simple example, if there be a barrel full of cricket balls, about three-quarters of the volume would be occupied, leaving about one-quarter space; if, instead, one used golf balls, or marbles, or lead shot, there would still be about one-quarter space, but to blow air through the barrel would be more difficult the smaller the ball used, because the passages would be narrower and there would be more corners to turn in the journey from one end to the other, *i.e.*, the permeability would be reduced. Thus, if each different foundry sand had a single grain size, control of permeability would be simple, but difficulty arises due to the fact that all sands have a range of grain sizes, some wide, others narrow.

Now in the barrel of cricket balls a number of golf balls, marbles and small balls would fit without the barrel overflowing, but under these conditions, if one again blew air through, although still full of cricket balls, one would find it difficult—the permeability would again be low—in fact, Sheehan showed that the quantities of the relative diameters completely to fill any container would be as follows:—

Dia. of spheres.	No. of spheres.	Per cent. of total volume.
1	1	74.2
$\frac{1}{2}$	1	5.2
$\frac{1}{4}$	10	5.1
$\frac{1}{10}$ to infinitely small ..	—	15.5

Under these conditions, permeability would be nil, but, although foundry sands do not pack completely, they consist of different sizes of grains, all coated with

Development of Foundry Sand Control

clay, and, in addition, many foundry sands contain a high proportion of extremely fine grains, as a result the permeability may be very low indeed (see Fig. 1, Mansfield sand; note spread of grains over three sieves with high percentages of fines and clay).

Returning to the barrel of cricket balls, if one tried to add tennis balls and billiard balls, instead of golf balls and marbles, the barrel would overflow because the new sizes would not fit in the spaces. If one filled the barrel with a mixture of these three sizes, the passages would be wider than when the sizes fitted, and it would not be difficult to blow air through; furthermore, one could use a mixture of any sizes between billiard balls and golf balls and, although the average size is less than the cricket-ball mixture, the permeability would still be high.

From these examples the following conclusions may be drawn:—(1) If the maximum size of sphere remains the same, a mixture of similar sizes gives higher permeability than a mixture of widely varying sizes, and (2) a mixture of smaller spheres all similar in size may give as high a permeability as a mixture of large spheres and a wide range of smaller spheres.

Applying these conclusions to sand grains it may be inferred:—(1) Coarse grained sands giving a poor surface finish may not be high in permeability if the smaller grains are of the size and quantity to fit in between the larger; and (2) providing the grains are similar in size —not fitting-in sizes—they can be comparatively small, and so give a good surface finish, without being too low in permeability.

In practice, with the exception of grains 60 mesh and larger (0.01 in.)—and such grains would be limited, due to their detrimental effect on surface finish—the only grain size which fits in is that less than 200 mesh (0.003 in.), and is therefore "pan grade," so the main problem of raising permeability from the viewpoint of fitting in, is resolved into reducing the pan grade to a minimum. Thus, the aim in selecting a sand is to have most of the grains on 100, 150 and 200 mesh sieves, with a minimum amount of fines.

First Application of Sand Control

Applying this conclusion to the problem of scabbed castings from the brass foundry machine, it was obvious the chief trouble lay in the low permeability caused by the high proportion of fines in Mansfield sand—26 per cent. pan grade plus 13 per cent. clay grade being more than sufficient, in theory, to pack into a completely compact mass—with, as a contributory factor—the remaining grain sizes mainly on the 150 and 200 meshes. (See Fig. 1.)

It was reasoned that if the fines and clay could be reduced and the amount on the 100 sieve increased, the permeability would be raised without serious deterioration of surface finish. Southport sea sand, already in use for the oil-bonded cores, had the ideal grain distribution to produce the alteration desired (see Fig. 2). A new facing mixture was made to include both Mansfield and Southport sands. The change resulted in a rise in permeability and a lowering of green strength in the facing sand with similar, but more gradual, alterations in the backing sand. As the green strength fell towards the lower limit desired from 0.7 to 0.9 per cent., clay additions were made in the form of Fulbond No. 1. The results of daily tests during this period are shown in Fig. 6, hatched lines indicating the desired limits of moisture, green strength, and permeability.

During the two months this blended sand was in use, although the characteristics of the sand had altered, there was no noticeable difference in moulding properties, yet the moulds were poured quicker and there were no scabbed castings.

It must be remembered that the blended mixture was operating under very favourable conditions:—(1) Comparatively low temperature casting alloys; (2) it was a small self-contained unit of some 4 to 5 tons of sand with its own mill and aerator, and (3) the only real problem was to secure adequate permeability for the indiscriminate ramming of a power moulding machine.

Thus, although the blended sand was suitable under the above conditions, it only realised *one* of the properties desired in a new moulding sand, and could not be deemed wholly satisfactory when the different conditions brought about by the mechanisation of part of the iron foundry were considered.

General Considerations Regarding Moulding Sands

During the casting process clay is burnt and water is evaporated; at the knockout some sand adhering to the castings goes to the fettlers where it is usually discarded and dumped. It follows therefore that the losses to be made up are clay and moisture to restore the bond, and sand grains to restore bulk to the sand heap. Now the loss of clay and water is inevitable, varying roughly with the pouring temperature of the metal and the weight of the castings made, but the losses at the knockout are controllable and should be minimised, for every ton of sand bought means another ton to the dump, plus the cost of handling and transport. Moreover, the major part of the discard is facing sand with only the mould face burnt and, although this is generally regarded as useless, its grains can be re-coated with clay. In fact, in some plants, the burnt sand and used cores all mix with the knocked out moulds and, after being milled with new sand and/or clay additions, return to the mould machines; under these conditions the sand lost may be trifling.

If no sand be lost, only sufficient clay and water to restore the bond are necessary, but generally some new sand is required. High sand losses may amount to 15 per cent. and, on the basis of a mould containing one part facing to three parts backing, as much as 50 or 60 per cent. new sand would then be required in the facing mixture.

If light castings be made, then the clay burnt will be small, so a lightly bonded sand will suit, particularly with high knockout losses. Should the castings be heavy, the clay burnt will be greater, necessitating a more heavily-bonded sand and, if knockout losses are low, additions of clay may be desirable unless excess sand is to be dumped.

In general, if a sand of suitable grain size has double the clay content of another sand equally suitable, and its use provides enough bulk to keep up the sand heap, it is worth more than double the cost of the low clay sand, for it saves labour and transport costs and minimises the problem of dumping.

Moulding Sands Compared

From the study of Sheehan's paper, confirmed by personal experience with the blend of Mansfield and Southport sands in the brass foundry, one aim in selecting a new sand was to have most of the grains on 100, 150 and 200 mesh sieves with a minimum of fines. In this country such a combination in red moulding sands is not possible, for they all tend to have a wide spread of grain sizes and, as a rule, the higher the clay content the smaller the average grain size and *vice versa*. Thus, highly-bonded red sands are generally low in permeability, whilst the more permeable sands tend to be low in green strength and, due to large grain size, give a poor surface finish to the castings. (Compare Fig. 1, Mansfield, high clay, fine grain, with Fig. 4, Bramcote, low clay, coarse grain.)

Alternative to the red moulding sands are the Yorkshire yellow sands, either naturally bonded or blended with clays, some of which have grain sizes mainly on 100, 150 and 200 mesh sieves with small amounts of fines and high clay contents. Pickering Medium Sand (Fig. 5) is an example and, when compared with Mansfield and Bramcote, shows a marked difference in properties, for it combines reasonable permeability with good casting finish and high green strength. This particular sand is ideal when high clay and low sand additions are required, or it may be blended with silica sand to improve permeability if the consequent reduction in green strength is permissible.

Synthetic sands are a further alternative to red and yellow moulding sands. They are made from silica sands by the addition of bonding clays and, by virtue of the grains being mainly on one or two sieves with very little if any fines (see Figs. 2 and 3), their permeability is high for any particular maximum grain size. Thus a better finish is obtained than with naturally bonded sands of similar permeability and, by variation of the amount of clay added, green strength may be adjusted to suit requirements. In addition, the 3½ to 4½ per cent. moisture used, compared with the 6 to 7 per cent. moisture in naturally-bonded sands, considerably reduces the steam produced when pouring the moulds.

From the above it is obvious the essence of the problem of sand control for green sand mechanised plants is the balancing of the three factors: permeability, surface finish and green strength and, whilst this is difficult with red sands and easier with Yorkshire yellow sands, synthetic sands seem to give a solution to the problem. Nevertheless there are disadvantages as well as advantages, and these were summarised in "Modern Foundry Practice" as follows:—

Advantages of Synthetic Sands

(1) Lower cost of sand maintenance and no sand to dump; (2) improvement in permeability and lower moisture required and hence less chance of blown or porous castings, chilling, etc.; (3) sand easier to work on mass production moulding; (4) enables semi-skilled operatives to work moulding machines and (5) renders possible the use of old core sand and reclaimed sand.

Disadvantages of Synthetic Sands

(1) Probably higher first-cost; (2) drying out gives friability and washes; (3) patching is difficult; (4) balling up may give poor finish, and (5) synthetic sand needs more careful control than natural-bonded sand.

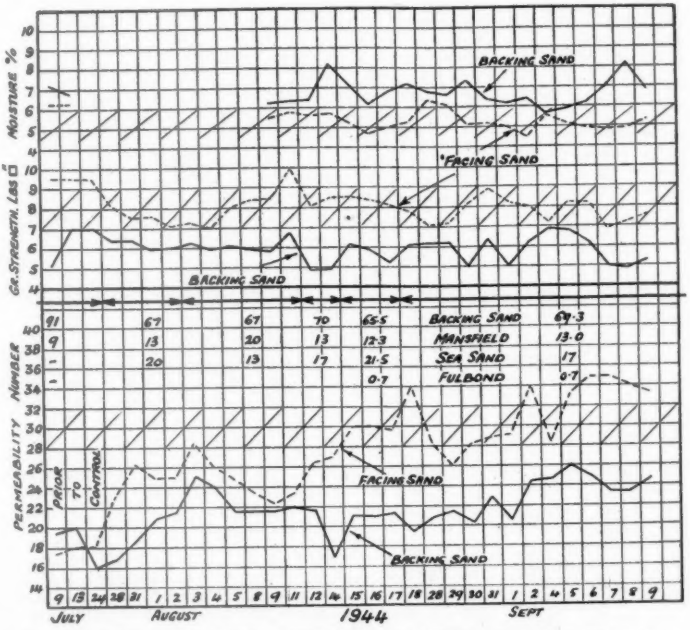

FIG. 6.—RESULTS OF DAILY SAND TESTS ON MANSFIELD + SOUTHPORT + FULBOND MIXTURE.

(*To be continued.*)

Rapid Annealing of Malleable Iron Castings*

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Modern Developments applied to French Problems

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By Gabriel Joly

Existing Practice

In France, the batch furnaces used for the annealing of malleable iron usually carry four or five pots, stacked, and placed on the hearth of the furnace. The interspaces between the castings are filled with used iron ore, sand, or other refractory material which will not stick to the castings at the annealing temperatures. The object of this packing is to protect the castings from oxidation by the combustion gases and to prevent the deformation of the castings at the bottom of the pots by the imposed weight of those above. There are several drawbacks to this process:—(1) The weight of the cans, bases, covers, and the ore represent two to three times the weight of the castings. This results in a heavy fuel consumption; (2) labour costs for packing, plus the cost of the pots, which rapidly deteriorate, enhance the cost of annealing; (3) the time taken for packing and discharging the pots increases delivery delays; and (4) because of the considerable calorific inertia of the furnaces, the raising of the temperature of the anneal and, after the maximum, the lowering of this temperature to the Ar 1 point, are prolonged, thus lengthening the overall annealing cycle.

The source of heat being local, there are important losses of temperature as between the various components in the furnace assembly. One is thus forced, in order that all the castings may be properly annealed, to follow the thermal cycle with the pots placed pyrometrically at the coldest spots.

Castings annealed in the same furnace have not always exactly the same chemical composition, as they may be made from different casts, or be made in melting furnaces giving non-uniform metal. It therefore follows that the time spent at the temperature which brings about the decomposition of the cementite and at the recalescence point Ar 1, must be sufficient to ensure that the malleablisation of the irons most difficult to graphitise is completed.

Improvements Required

For the reasons set out above, the annealing of black heart malleable when carried out in open flame furnaces is of considerable duration. It is not enough, when considering a rapid anneal, merely to gain a few hours on the annealing cycle, but it is also necessary to eliminate, if possible, the discharging and sorting of the castings, which takes up two or three days. American researches designed to reduce annealing time have particularly taken into consideration the following: (1) to eliminate packing, this measure introduces the necessity to control atmosphere, and so they have used electrically heated or natural-gas fired (radiant tube) furnaces; (2) to avoid the sorting of castings, which leads to the use of continuous furnaces.

Composition Factors

The solutions which are postulated involve the use of very costly fuels and necessitate the installation of large scale plant. In order that the cost price of annealing may not be too high, it is necessary to reduce the length of the thermal cycle, which is only possible with a metal for which the speed of graphitisation is high and for which the composition is standardised. The choice of this metal composition has only been rendered possible by researches into the various factors which affect the speed of malleablisation. The outstanding factors, classified in order of importance, are:—

(1) The silicon content of the white iron; (2) the annealing temperature; (3) the chromium content; (4) the manganese content in relation to sulphur; (5) the carbon content; (6) the atmosphere—neutral, oxidising or carburising; (7) the degree of superheating of the metal before casting; (8) the speed of cooling after casting; and (9) the source of the pig-irons. The influence of these factors is detailed below.

White Iron for Rapid Annealing

Carbon and Silicon.—Recent work at the University of Michigan by White and Shneidewind[1] showed the effect of composition on irons produced in a reverbatory furnace having varying silicon contents and with the carbons running between 2.0 and 2.5 per cent. The raw materials used for melting; the casting conditions (superheat of the metal) and the speed of cooling after casting were maintained constant. The conclusions reached were:—

(*a*) *Carbon Content.*—This has but little influence on the annealing time. At 925 deg. C. the decomposition of the cementite of irons containing 0.90 per cent. silicon necessitates for 2.50 per cent. carbon, two hours extra as compared with 2.0 per cent. carbon.

(*b*) *Silicon Content.*—This plays a very important part in the various stages of malleablisation. Time decreases logarithmically as the silicon increases. One can, by taking account of the overwhelming influence of silicon on graphitisation, give the annealing time as a function of the silicon contained, as set out in Table I.

*Translated from *Fonderie*, No. 22.

TABLE I.—*Annealing Time Related to the Silicon Content.*

Per cent. Si.	Hours at 925 deg. C.	Hours at Ar. 1.
0.70	20	85
0.80	16	65
0.90	12	50
1.00	10	40
1.10	8	30
1.20	6	24
1.30	5	18
1.40	4.5	14
1.50	3.5	11
1.60	3	8.5
1.70	2.3	6.5
1.80	2	5
1.90	1.6	4
2.00	1.4	3

Superheating and Cooling.—A metal superheated to varying degrees and cast at the same temperature (1,540 deg. C.) should be annealed at a rate, the speed of which will vary with the superheating thus:—

Temperature of superheat deg. C.	1,600	1,650	1,705	1,760
Percentage reduction of anneal	12	27	43	48

The anneal is also quicker if the casting has been rapidly cooled. This is due to the fact that the cementite crystals are thereby smaller.

Annealing Temperature.—The malleablisation times corresponding to various temperatures are progressively shorter as the temperatures are higher.[2] The relation connecting the time which is necessary for the decomposition of the carbides with temperature is of a logarithmetrical character. It would seem therefore that there should be an advantage in annealing at high temperature in order to reduce time. Unfortunately at high temperature the graphite no longer precipitates in regular nodules, and the mechanical properties of the metal are lowered. This[3] has been demonstrated by heating in a laboratory electric furnace samples of white iron (carbon 3.41; silicon 0.94; manganese 0.37; sulphur 0.22; and phosphorus 0.22 per cent.) at temperatures ranging from 700 to 1,000 deg. C. The annealing graphite has a nodular form when produced at a temperature below 900 deg. C. and a lamellar structure when 1,000 deg. C. is exceeded. The temperature at which the annealing graphite ceases to be in the form of nodules, varies, moreover, with the composition of the iron, and depends upon the raw materials used in the original charge. The irons obtained from the cupola or a rotary furnace starting off with a high percentage of steel scrap, which carries oxygen in the form of oxide, are less easily graphitisable than are those of identical composition cast from the air furnaces starting off with hematites. The former have therefore to be annealed at a higher temperature.

Choice of Furnace

From the above, it is concluded that in order for the cost price to be reasonable the following are necessary:—To have a metal of regular chemical composition, which involves the use of special melting furnaces (air, rotary or electric); to confine oneself to irons easily graphitisable, that is to say, irons with low carbon (2.50 per cent. maximum) and with high silicon. The composition of such an iron should be determined experimentally in each particular case, taking into account not only the size of the castings to be made (maximum section thickness) but also the method of melting and the raw materials to be used.

Electric Annealing Furnaces

The use of a continuous furnace is only of interest if the plant is constantly used to its maximum capacity. It is therefore necessary that the foundry only uses it for the minimum tonnage that it makes, the excess being annealed in batch furnaces. The furnaces available are of three main types:—

(1) *Elevator Furnaces.*—The castings are packed without ores, etc., or pots, on a bogie which is raised hydraulically or electrically into the heating chamber of the furnace of which it forms the hearth. The heating is carried out by means of nickel chrome resistances placed against the side walls. The current consumption depends upon the thermal cycle and the size of the furnace. The figures reported by the technical press are very variable. One might accept those given by the Westinghouse Electric and Manufacturing Company, which relate to furnaces having controlled atmospheres and ranging from 10 cwts. to 25 tons capacity, and which demand from 26 to 72 hours as annealing time. These figures are set out in Table II.

TABLE II.—*Current Consumption Related to Furnace Capacity for Malleable Annealing.*

Capacity in tons.	Power in kWh.		kWh per Ton annealed.
	Maximum.	Minimum.	
23	600	75	375
11	600	75	450
7	600	75	500
0.9	600	75	625
0.45	40	13	775

The cost of anneal in such a furnace is higher than that associated with the use of pulverised coal. The gain in time is important despite the fact that the sorting of the castings may not have been eliminated.

(2) *Bell Furnaces.*—The resistances are located inside a cover which encloses the castings stacked on a bogie. It is, in a way, a reverse layout to that just described. The current consumption is of the same order.

(3) *Continuous Furnaces.*—The castings, free from packing, are carried in small cages through a tunnel furnace. They leave in the same order as they start, which avoids sorting. The current consumption should be fairly low—stated to be of the order of 300 kWh. per ton for an anneal of 35 to 40 hours.

Besides the advantages which result from the shortening of the delivery period, it should be noted that the rapid cooling of the castings below the temperature of the Ar 1[4] point brings about a marked improvement in the resilience of the castings—an important factor.

E

Rapid Annealing of Malleable

Fuel Oil Fired Furnaces

The high price of electric current sways the French foundryman, in most cases, towards furnaces of small capacity fired by the cheaper fuels. To avoid the great thermal inertia of the furnaces, attention should be drawn to the use of continuous furnaces fired with fuel oil or to batch furnaces of small capacity.

Continuous Fuel Oil Fired Furnaces.—The castings can be placed on bogies passing through the interior of a Carborundum-lined muffle, thus isolating them completely from the products of combustion. In the furnace, the atmosphere can be controlled and packing and sorting completely eliminated. Even if the fuel consumption seems relatively high for small plants (50 or 60 tons per month), the final cost price is considerably reduced.

Small Batch-type Furnaces.—These are hearth furnaces of 5 to 6 tons capacity carrying 8 or 10 burners spaced along the length of the side walls. Due to the small capacity, the rise in temperature is quite rapid (8 to 10 hours), and it is possible to guarantee a temperature of 920 deg. C. ± about 10 deg. and a temperature of 720 ± about 7 deg. C. for the operating conditions. If the reduction of the cost price is not nearly so great as that to be associated with the continuous furnace, yet the fuel consumption per ton is scarcely higher.

REFERENCES.

[1]White and Schneidewind. "Theory of the Rapid Annealing of Malleable." Bull. Assoc. Tech. Fond., October, 1933, pp. 393-397.

[2]White and Gladhill. "Influence of Temperature and Composition on the Graphitisation of Blackheart Malleable." Trans. A.F.A. No. 30, p. 413. 1[illegible]

[3]A. Le Thomas and (Miss) R. Le Romancer. "The Influence of the Annealing Temperature on the Shape of the Precipitated Graphite." Supplement to Bull. Assoc. Tech. Fond., September, 1932, pp. 18-19.

Danish Co-operative Activities

In a letter received from Mr. Ove Hoff he states that in Denmark there are three co-operative institutes of which he is the director. The first two are the *Stöbereriindustriens Forsögs-og Undervisningsstöberi* (the research institute and training school for the Danish foundry industry). These were started during the war and they co-operate closely with the third, a consulting service, "*Danske Jernstöberiers Stöberikonsultation.*"

MR. H. R. DAPLBERG, who, as an American Naval Officer, made many friends amongst foundrymen in this country during the war, has now been appointed Professor of Industrial Engineering in Oregon State College.

Shadow and Substance

(*Continued from column* 2.)

zeal of socialist governments which know what their citizens ought to eat and wear and produce; who know that a fair price is better than any open market; who are determined to preserve liberty even at the cost of putting every citizen in jail.

Shadow and Substance

As everybody in this country is thinking about controls, we thought it of interest to reprint an Editorial written by Mr. J. S. Lawrence in the latest issue of "The Iron Age" to reach this country.

The statistician looks at the wholesale price index of the Department of Labor. The housewife looks at the price of butter, beefsteak and baby sitters. The steel executive looks at wages, scrap, transportation and fuel. They have all gone up. It is an easy matter, therefore, to speak of high prices as inflation, to identify the end results as the substance of the problem.

Nothing in holy writ bars the term "inflation" as a description of high prices. In the physical field, the term does describe expansion, particularly where the force is air or gas. It is, therefore, an apt and ready tag to apply to dollar butter or three dollar wheat.

Our trouble begins and confusion is confounded when we try to do something about it. Description, diagnosis and prescription are three distinct functions of medical practice. Symptoms make diagnosis possible, and both together determine appropriate treatment. However, that treatment must reach the cause. The great fallacy of price control is that it touches only symptoms.

No doctor will prescribe a noose or a gag for a cough, although both would be "effective" treatments. Price control, as proposed by the interventionists, is on all fours with a fever treatment that places the patient in an icebox. It reaches for the outer symptom of the disease and in so doing weakens the patient and may ultimately prove fatal.

Our memories here are pathetically short. Markets to-day bulge with goods. The housewife may not like the price of hamburger or diapers but she can buy all she wants—provided she is willing and has the means. The latter is a problem of choice—her choice—and not that of an administrator in Washington. The degree of inconvenience to which she will submit is exclusively her decision. No distant functionary has the authority to say that she may buy only six ounces of fat per week or two pairs of stockings per year. The shelves are filled. The choice—a free choice—is entirely her own.

Have we so soon forgotten the O.P.A. and its volumes of conflicting regulations, with tardy decisions by incompetent officials, with black markets, with ugly corruption and intolerable market chaos? Have we forgotten so soon that the state cannot force men to work and that a mistaken or angled price decision may stifle production? Is it necessary to recall the refusal of ranchers at the end of the O.P.A. period to send their cattle to market and the proposal of the New York City Council that the government seize their property by force?

At a time when the whole world is desperately in need of more food, more clothing, more raw material and industrial equipment, no deliberate design could retard production more effectively than price control. There is impressive evidence in Europe to-day that the authentic cause of its current crisis is not the destruction of war or threat of Communism, but the misguided

(*Continued at foot of column* 1.)

Compressed Air in Foundries

Planning and maintenance features

*By H. J. Bullock**

We are accustomed to hearing that "compressed air is the most expensive form of power," and whilst this is generally admitted, there can be no denying that it is a very convenient form of power, of profound importance to the foundry industry.

A Stage in Growth

Installation of an air compressor in a small foundry almost always marks an important stage in the growth of that foundry, and is normally associated with a decision to install either pneumatic moulding machines or a sand or shot blast. If it be moulding machines, a compressor working at a pressure of 80 to 100 lbs. per sq. in. will be decided upon, and if a sand or shot blast be added at a later date, it would only be necessary to include an air pressure transformer or pressure reducing valve in order to obtain a supply of air at a pressure of 30 lb. or so per sq. in., according to the new requirements. In cases where the compressor is installed solely to supply air to a low-pressure blasting plant, it is, of course, not possible to "transform" the air up to 80 to 100 lb. per sq. in., and this is likely to prove a matter of considerable regret, as most pneumatic appliances intended for use in the foundry are designed for operation with air in the 80 to 100 lb. per sq. in. range. There are many founders to-day who are wondering whether to buy an additional compressor (and air receiver) to work at the higher pressure or to scrap the low-pressure job and purchase a new installation of sufficient capacity to cover all needs. It follows that the question of pressure is one of considerable importance when considered in relation to future plans and not less important is the matter of capacity.

Allowance for Contingencies

It is not a sound plan to install a pair of moulding machines requiring (for example) 30 cub. ft. of free air per complete mould produced, coupled to a 20 ft. per min. compressor, if an output of 30 moulds per hr. is required, for, whilst it is theoretically possible to achieve this result, a slight air leak or a falling-off in efficiency of motor or compressor will result in the operator "waiting for air" or worse, producing soft moulds. Compressed air is, indeed, a useful servant and, once installed, the tendency is to make increased use of it; this being the case, it is wise to err on the generous side when considering the question of compressor capacity, and this is particularly true if an automatic "pressure switch" be included in the installation.

Among the items of pneumatic plant likely to be added after moulding machines have been installed are (in addition to more moulding machines) sand or shot blasts, coreblowers, core jolters, blowguns, vibrators, rammers, chipping hammers, grinders, vices, cylinder and rotary hoists, ram-operated conveyors and knockouts, sprays for blacking, etc., and air agitated blacking tanks. The foregoing list by no means exhausts all the possibilities for the use of compressed air in foundries.

Double the Estimate

Many foundrymen make use of their compressor to speed up the tedious job of limewashing, and an interesting addition to the list, referred to recently by the Editor of the JOURNAL, was blowing air across the protruding end of a core tube in order to expedite the elimination of gases from a large core. In general, it pays to calculate the exact requirements, double the figure, and then take it up to the nearest standard size of air compressor. There is, however, a case to be made out for small economic units and a growing tendency is for foundries requiring, say, a peak load of 500 cub. ft. of free air per min. to install a battery of

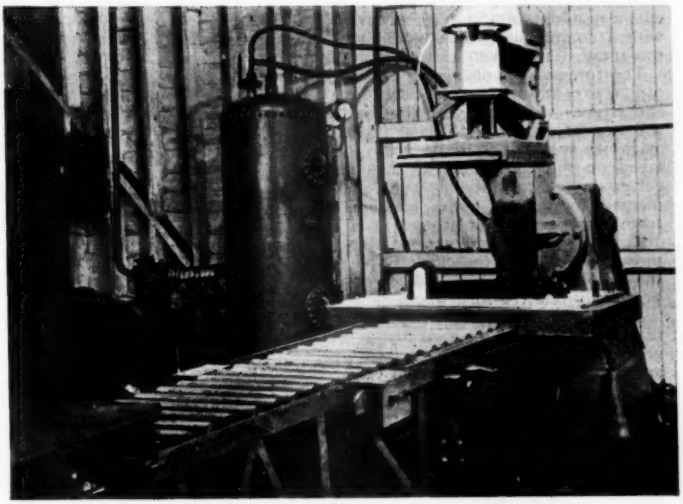

FIG. 1.—SINGLE MOULDING MACHINE UNIT WITH COMPRESSOR ADJACENT.

*The Author is on the Staff of the British Moulding Machine Company, Limited.

Compressed Air in Foundries

five 100 cub. ft. per min. compressors, for, although the capital expenditure is greater, the compressors can be operated much more economically; and, a failure in the electricity supply excepted, the possibility of a complete cessation of production owing to the breakdown of a single compressor is eliminated. Fig. 1 shows a single moulding machine unit with its compressor and receiver fixed adjacent to it.

Air Receivers

There is at least equal need to be generous in the selection of a suitable receiver, and here, again, it pays to " think of a number and then double it "! A 48-in. by 18-in. dia. air receiver has a capacity of 7.068 cub. ft. and, with air compressed to six atmospheres, or approximately 90 lb. per sq. in., will contain just over 42 cub. ft. of free air. If such a receiver were coupled to a 20 cub. ft. per min. compressor for the purpose of operating a moulding machine requiring 30 cub. ft. per half-mould, it would not be possible to go through the cycle of pneumatic operations in one minute, because the machine would consume 30 ft., the compressor would replace only 20 ft. during that time, and the resulting deficiency would reduce the pressure in the receiver to rather less than 70 lb. per sq. in.—insufficient for any machines designed for operation within the 80 to 100 lb. per sq. in. range. If, however, a 60-in. by 24-in. receiver were used under the same conditions, the deficiency would not be enough to cause the pressure to drop below 80 lb. and, since the receiver would become refilled during the operation of putting on the next box, using parting powder, riddling facing sand, etc., a moulding machine as specified could be operated with a compressor which would have been considered too small if used with a smaller air receiver.

The foregoing applies only to small foundries where capital expenditure has to be more carefully considered, and it goes without saying that a mechanised foundry will not be prepared to have its battery of moulding machines working at half speed for the sake of £50 saved on the compressed-air installation. An air receiver can be considerably supplemented by the air pipes leading from it to the points of usage, and 100 ft. of 3-in. dia. piping will more than double the capacity of the 48-in. by 18-in. receiver previously referred to.

Pressure drop, or loss of pressure through friction in pipes, is not as great as is sometimes represented, and a pressure gauge connected *via* 1,000 ft. of 2-in. dia. pipe to a 100 ft. per min. at 80 lb. per sq. in. compressor would record nearly 79 lb. per sq. in., a pressure drop of less than 1½ lb.

Air Leaks

If it be true that compressed air is the most expensive form of power, then air leaks are clearly a very expensive item. From Table I it will be noted that air at 100 lb. per sq. in. will pass through a ⅛-in. dia. hole at a rate of 25.8 cub. ft. per min.; a 6-h.p. motor would be required to drive a 25 cub. ft. per min. compressor, and it follows that the cost of maintaining a ⅛-in. dia. leak is the cost of driving a 6-h.p. motor, plus depreciation of plant! Another way of expressing the wastefulness of a ⅛-in. dia. leak, or a number of leaks amounting to ⅛ in., is to state that the air lost would be sufficient to operate a pair of moulding machines making moulds in 16-in. by 13-in. boxes at a sustained rate of sixty complete moulds per hr. A really efficient jolt ramming machine can itself cause many minor leaks by transmitting its shocks to the various joints in the piping, and it is a good plan to use a short length (6 in. is sufficient) of rubber hose as the final connection to the machine.

TABLE I.—*Loss of Air (at 100 lb. Pressure) Through Various Sized Holes.*

Diameter of hole in inches.	1/16	1/32	1/16	1/8	1/4	3/8	1/2	5/8	3/4
Air in cub. ft.	0.400	1.61	6.45	25.8	103	231	412	645	925

Other causes of lost air are leaks in pipes fixed too high for the leak to be easily audible and leaks in pipes left buried in the ground following removal of air-operated plant; in the latter case, it is possible for a valve in a ¼-in. pipe leading under ground to be turned and left full on without anyone hearing the escaping air. The best time to track down air leaks in the foundry is at the week-end, and it is a good plan to commence by starting up the compressor, switching off when full pressure has built up, and then noting how quickly the air disappears, even though none of the pneumatic appliances are in use.

The next step is to go into the foundry, where the investigator may immediately become aware of what a well-known foundry manager once described as " bags of hissing serpents "! All too often the hissing will be found to emanate from the business end of blow-down hoses, as blowguns are used so freely throughout the day that nobody will bother to report a slight leak in one.

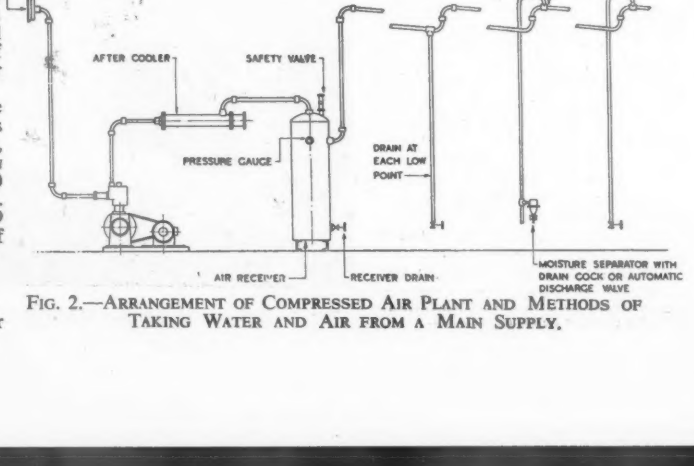

FIG. 2.—ARRANGEMENT OF COMPRESSED AIR PLANT AND METHODS OF TAKING WATER AND AIR FROM A MAIN SUPPLY.

Wet Air

A cubic foot of air compressed to a pressure of 100 lb. per sq. in. contains nearly seven times as much moisture as a cub. ft. of free air. The ability of air to carry water vapour is approximately doubled with each 20 deg. F. increase in temperature, and since the air is sufficiently heated by compression, all the moisture will be passed through the compressor and into the receiver, where it commences to cool and the cooling is accelerated when the air flows out into the supply pipes. Water will be deposited during the whole of this cooling process and the air will eventually throw out something like six-sevenths of its moisture content. This reduction in the ability of air to carry moisture when the temperature is lowered is evidenced when a warm day is followed by a chilly evening and the moisture formerly carried in the form of invisible vapour appears as visible vapour or mist.

The undesirable effects of the precipitated water on the finely finished parts of pneumatic machinery are only too obvious and all reasonable steps should be taken to eliminate as much of it as is possible before the air reaches the points of usage. The most important method of moisture reduction is after-cooling, which consists of water-cooling the air to approximately intake temperature before it reaches the receiver; after-cooling will remove 1 gall. of water per hr. from air compressed to 100 lb. per sq. in. by a 400 cub. ft. per min. compressor. In order to obtain reasonably dry air, all receivers should be fitted with suitably placed drain cocks which require to be opened every day or, better still, fitted with automatic discharge valves.

The air main should have a constant "fall," or, if it be a long one, a series of rises and falls with water drains arranged at all low points; tees for downpipes should be turned upwards and fitted with two bends so that there is no tendency for precipitated moisture to run directly into the drainpipe (see Fig. 2). It is almost impossible to remove all the water from compressed air, even when after-cooling is employed, and small water separators or filters serve a useful purpose if fitted as near as possible to the various pneumatic tools, etc. These separators remove water from the air by centrifuging, by changing the direction of flow as many times as possible, by ceramic or other types of filters or by combinations of these systems. Most makes can be fitted with automatic discharge valves and these valves are to be recommended, as the daily opening of the manual type of valve is apt to become overlooked.

THE ADMIRALTY RADIOGRAPHICAL laboratory at Chatham was opened in June, 1946. So far it has been mainly engaged on X-ray work, but gamma ray examinations form part of its service, and it is intended to develop the use of supersonic and magnetic deep fault detection methods. At present, however, the laboratory is fulfilling a necessary function in assisting the development of welding techniques and the maintenance of a good standard of welding in the dockyard generally, and also assisting the foundry in the study of casting technique.

Notes from the Branches

South Africa

This Branch, like London, has realised that for attracting a large attendance there is nothing better than an evening carrying a film display. Thus for the November meeting, over which Mr. J. H. West presided, no fewer than 70 members gathered to see three films. These were "Safety and Hygiene in the Foundry," "British Moulding Machines" and "The Development of Meehanite." The showing resulted in quite a good technical discussion.

Newcastle-upon-Tyne

A large attendance at the February meeting heard Mr. F. C. Evans, A.I.M., member of the London Branch, who read a Paper on "Some Practical Aspects of Bronze Founding."

Before introducing Mr. Evans, Mr. W. Redmayne, the President, welcomed the return of their secretary, Mr. C. Lashly, after his recent illness and thanked Mr. N. Charlton for carrying out the secretarial duties in the interim.

Initially, Mr. Evans stressed the importance that foundrymen should give continuous attention to the theoretical ideas of scientists and inventors with the object of incorporating them in actual practice wherever they could do so with advantage. The progress of founding in the ferrous field should not be ignored when considering non-ferrous problems.

Mr. Evans dwelt in detail with the characteristics and manufacture of manganese bronze and its various alloys. From his experience, he illustrated the moulding and casting of these metals by numerous photographs and graphs on the screen.

Answering questions, MR. EVANS insisted on the necessity for non-turbulence in the running of the metal into the mould, and showed the advantages of the use of the horn-gate runner very effectively on the screen. In feeding there were three separate chokes which ensured the flow of hot metal was free from dross, before it actually entered the bottom of the mould. The area of these chokes, the dimensions of which were of the greatest importance, were in the relation of 5, 3 and 2.

With the reverberatory furnace he had had good results, but greater care had to be taken than in crucible casting; the costs of the latter might, however, be higher. He had tried marble for de-gassing, but had not found it very practicable; if put in the bottom of the ladle, chips had a chilling effect. A hearty vote of thanks to the speaker concluded an interesting evening.

B.C.I.R.A. Elects New Members

The following firms have ben elected to the British Cast Iron Research Association. The name of the representative is quoted between brackets:—

Alley & Maclennan, Limited, Worcester (J. M. Dick); John Every (Lewes), Limited, Lewes (A. R. Oldershaw); and Sheppard & Sons, Limited, Bridgend (G. F. R. Hayes).

Institute Elects New Members

(*Continued from page* 179.)

FIRST LIST—*Contd.*

As Associate Members

J. R. Burrows, pattern maker, Ruston & Hornsby, Lincoln; A. C. D. Chambers, technical representative, Enfield Rolling Mills (Aluminium), Limited, London; R. W. Chapple, works estimating engineer, Jeffrey-Galion (Pty.), Limited, Johannesburg; E. Charlton, technical representative, Wm. Aske & Company, Halifax; A. E. Cohen, works manager, A. Cohen & Company, Limited, London; T. Y. Coleman, foreman core maker, Robey & Company, Limited, Lincoln; A. E. Cook, foreman, Rutland Foundry Company, Limited, Ilkeston; J. Currie, assistant foreman, G. & J. Weir, Limited, Glasgow; C. S. Cuthill, assistant foreman moulder, R. Taylor & Company, Falkirk; J. Eadie, foundry manager, Carron Company, Falkirk; C. Ford, metallurgist, B.C.I.R.A., Alvechurch; J. Fraser, foreman pattern maker, Renfrew Foundries, Limited, Hillington; L. Freeman, foundry foreman, H. Sampson, Bristol; H. E. Gilbert, assistant foreman, Rolls Royce Limited, Derby; R. Goodair, chargehand, English Electric Company, Bradford; T. Gudgeon, moulder, C. W. Taylor & Sons, Limited, South Shields; W. S. Hanson, machine shop manager, W. Slingsby & Company, Keighley; L. Hargreaves, metallurgical chemist, Hawthorn Leslie & Company, Limited, Newcastle; F. A. Horsfall, iron moulder, Croft's (Engineers), Limited, Bradford; J. Humpston, foreman core maker, Rolls Royce, Limited, Derby; D. A. C. Hutchison, engineer director, Erifo, Limited, Dartford; D. H. Jaggar, metallurgist, Croft's (Engineers), Limited, Bradford; W. A. James, pattern maker, Ruston & Hornsby, Limited, Lincoln; W. A. Kent, foundry foreman, Bristol Foundry Company; J. Kilner, iron moulder, J. Addy & Son, Limited, Huddersfield; R. Lorang-Larsen, metallurgist, International Meehanite Metal Company, London; A. Lennox, pattern maker, Mirrlees Watson & Company, Glasgow; K. S. Lever, moulder, C.V.A., Limited, Brighton; J. Little, assistant foreman moulder, Clyde Alloy Steel Company, Motherwell; C. Longfellow, plant engineer, English Electric Company, Limited, Bradford; A. McDonald, assistant foundry foreman, L.N.E.R. Company; Miss J. E. McFarlane, B.Sc., metallurgist, Mirrlees Watson Company, Limited, Glasgow; G. D. McNair, steel moulder, Atlas Steel Foundry, Bathgate; D. Martin, engineers' draughtsman, Croft's (Engineers), Limited, Bradford; R. C. A. Miller, cost accountant, Bristol Foundry Company, Limited; W. Paton, chief chemist, Carron Company, Falkirk; W. R. Peirson, pattern maker, Consett Iron Company; D. Pivalizza, master pattern maker, Green Point, South Africa; R. W. Pollard, instructor in pattern making, Oundle School; H. Price, foreman core maker, Ruston & Hornsby, Limited, Lincoln; J. Robb, iron moulder, Singer Machine Company, Glasgow; W. Robertson, pattern maker, Stow College, Glasgow; R. J. P., Rosewarne, pattern maker, Transvaal Metal Merchants, Johannesburg; E. Smith, foundry manager, Butler Machine Tool Company, Halifax; J. Smith, foreman moulder, Grahamston Iron Company, Limited, Falkirk; J. A. Smith, assistant foundry foreman, Clyde Alloy Steel Company, Motherwell; A. S. H. Steene, pattern maker, V. Moyle & Company, Kingston; T. Stewart, inspector of castings, Cruikshank & Company, Denny; G. Surtees, foreman moulder, British Oxygen Company, Limited, Wembley; W. Swift, foreman pattern maker, Butler Machine Tool Company, Limited, Halifax; A. C. Sykes, pattern maker, Brook Motors, Limited, Huddersfield; J. E. Thomas, foundry foreman, Warwill, Limited, Abertillery; F. Thompson, partner, A. & F. Howgate, Bingley; T. L. Walker, moulder, Ruston & Hornsby, Limited, Lincoln; R. J. Warrant, chief draughtsman, John Dale, Limited, London; W. W. Williams, moulder, Mangold Bros., Port Elizabeth, South Africa; A. Wilson, training instructor, Renfrew Foundries, Limited, Hillington; J. W. Wray, pattern maker, Ruston & Hornsby, Limited, Lincoln; P. Yeoman, pattern maker, Bristol Foundry, Limited.

N. F. Douglas,† foreman moulder, Clyde Alloy Steel Company, Motherwell; J. D. Gardom,† foundry engineer, John Gardom & Company, Ripley; C. S. Leather,† assistant chargehand, International Combustion, Limited. Derby.

As Associates (over 21)

F. L. Aldridge, assistant metallurgist, West Yorkshire Foundries, Leeds; N. Barras, moulder, C. W. Taylor & Son, Limited. South Shields; J. F. Burrell, moulder, C. W. Taylor & Son, Limited; L. W. Drennan, pattern maker, Dunswart Iron & Steel Works, Benoni, South Africa; W. G. Erskine, iron moulder, Cruikshank & Company, Denny; D. S. Forsyth, moulder, Cruikshank & Company; A. Galloway, moulder, Cruikshank & Company; A. Gardiner, steel moulder, Cruikshank & Company; S. T. Gilpin, apprentice patternmaker, Dunswart Iron & Steel Works, Benoni, South Africa; D. W. Goodsir, moulder, C. W. Taylor & Son, Limited, South Shields; A. J. Greyling, moulder, Dunswart Iron & Steel Works, Benoni, South Africa; P. S. Grieves, moulder, C. W. Taylor & Son, Limited, South Shields; M. Lindecke, moulder, Wright, Boag & Head Wrightson, Johannesburg; F. McCafferty, moulder, Clyde Alloy Steel Company, Motherwell; J. Marshall, pattern finisher, Cruikshank & Company, Denny; A. H. Robson, apprentice metallurgical chemist, R. & W. Hawthorn Leslie & Company, Limited, Newcastle; D. Ross, apprentice, J. Parkinson & Son, Shipley; D. G. Sleith, moulder, Clyde Alloy Steel Company, Motherwell; G. Smith, moulder, Cruikshank & Company, Limited, Denny; L. Stocks, moulder, Cruikshank & Company, Limited; K. Stokoe, junior draughtsman, Consett Iron Company, Limited; R. Wilson, moulder, Cruikshank & Company, Limited.

As Associates (under 21)

T. C. Askwith, apprentice metallurgist, West Yorkshire Foundries, Leeds; R. J. Burrell, apprentice pattern maker, Swan, Hunter & Wigham Richardson, Limited, South Shields; D. Challis, apprentice moulder,

†Transferred from Associate.

B. Rhodes, London; R. E. Gossett, apprentice, Enfield Foundry, Limited, London; R. Hartshorn, apprentice pattern maker, Ley's Malleable Casting Company, Derby; R. Holmes, apprentice moulder, Jarrow Metal Industries.

SECOND LIST

As Subscribing Firm Member

Stevenson & Cook Engineering Company, Limited, P.O. Box 10, Port Chalmers, New Zealand, engineers, shipbuilders and foundrymen (representative, T. J. Knewstubb).

As Members

P. E. Blincow, foundry commercial representative, Howrah, India; A. H. Chappell, works manager, Bailey Pegg & Company, Limited, Brierley Hill; T. E. Downs, foundry manager, C. Akrill, Limited, West Bromwich; A. E. Garrison, general manager, W. H. Micklethwait & Company, Limited, Rotherham; B. Millington, chief inspector and metallurgist, De La Rue Gas Developments, Leamington; A. J. Morrish, foundry manager, Aero & Motor Aluminium Castings, Limited, Birmingham; J. H. Osborn, B.A.(Cantab.), production and planning department, S. Osborn & Company, Limited, Sheffield; J. Pettigrew, steel foundry superintendent, David Brown Foundries, Limited, Penistone, Sheffield; G. H. Stevens, senior ironworks chemist, Cochranes (Middlesbrough) Foundry, Limited; H. C. Yaffe, general manager, Darwins, Limited, Sheffield.)

W. H. Hopkins,* foundry manager, East Rand Engineering Company, Limited, Germiston, South Africa; K. W. Smith,* metallurgist, Humber, Limited, Coventry.

As Associate Members

F. Bradley, foundry foreman and director, Bailey Pegg & Company, Limited, Brierley Hill; A. Cutts, managing director, Hadley & Cutts, Limited, Wolverhampton; A. Dale, ironworks chemist, Cochranes (Middlesbrough), Limited; S. Dutt, B.Sc., engineering trainee, Midland Motor Cylinder Company, Smethwick; P. W. Forgham, metallurgical chemist, Midland Motor Cylinder Company; L. Gresham, production engineer, J. H. Fenner & Company, Limited, Bradford; R. K. Jackson, moulder, L. Wilkinson, Limited, Blackburn; R. Jelley, assistant foundry metallurgist, Humber, Limited, Coventry; H. A. Jones, pattern maker, J. Wright & Company, Birmingham; J. P. Kenyon, foundry assistant, British Northrop Loom Company, Limited; M. Marsh, foundry metallurgist, Northern Aluminium Company, Birmingham; C. J. Moore, works metallurgist, Cannon Iron Foundries Company, Limited, Bilston; H. Murray, moulder, Morrison, Ingram & Company, Limited, Manchester; J. H. O'Sullivan, works manager, Constructional Engineering Company, Limited, Birmingham; H. O. Plant, pattern shop foreman, Bailey, Pegg & Company, Limited, Brierley Hill; W. G. Stilwell, moulder, East Rand Engineering Company, Germiston, South Africa; G. H. Thompson, foundry manager, Crane Foundry Company, Limited, Wolverhampton; G. L. Turner, B.Sc.Met., metallurgist, Bridge Foundry, Limited, Wednesbury; F. Watkins, foreman pattern maker, Crane Foundry, Limited, Wolverhampton; S. J. Weaver, estimator and planner, Crane Foundry Company, Wolverhampton.

As Associates (over 21)

K. J. Daniels, foundry apprentice, Crossley Bros., Limited, Manchester; M. A. Flynn, pattern maker, Alvis, Limited, Coventry; C. P. Hemming, trainee, F. H. Lloyd & Company, Wednesbury; K. L. Keys, Greenside Foundry Company, Limited, Sheffield; H. F. Mitchell, metallurgical student, British Foundry School.

As Associates (under 21)

A. Ball, apprentice pattern maker, Craven Bros., Manchester; T. H. L. Bond, metallurgical assistant, John Harper & Company, Limited, Willenhall; R. Cadd, apprentice pattern maker, National Gas Engine Company, Lancs; J. Catlow, apprentice pattern maker, Craven Bros., Manchester; A. Chestney, moulder, Mather & Platt, Limited, Manchester; S. C. Cox, production department, Great Bridge Foundry, Tipton; E. S. Jackson, apprentice moulder, Brown, Lenox & Company, Limited, Pontypridd; R. A. Layland, apprentice metallurgical chemist, Bean's Industries, Limited, Tipton; C. Matthee, pattern maker, Benoni Engineering Works & Steel Foundry (Pty.), Limited, South Africa; B. Richardson, apprentice metallurgist, West Yorkshire Foundries, Limited, Leeds; D. A. Sellars, apprentice pattern maker, National Gas Engine Company, Stockport; P. W. Venter, apprentice moulder, Dunswart Iron & Steel Works, Benoni, South Africa; W. T. Wakeman, metallurgical assistant, John Harper & Company, Limited; G. Walker, apprentice moulder, J. Berrys; H. A. Wyngard, apprentice pattern maker, Perfection Piston Manufacturing Company, Johannesburg.

THIRD LIST

As Subscribing Firm Member

R. W. Collin, Limited, Pallion Foundry, Sunderland (representative, J. J. Collin, Jun.).

As Members

D. Barrett, director, John Robson (Shipley). Limited; C. F. Lawson, foundry manager, Buckley & Taylor, Limited, Oldham.

As Associate Members

A. Braybrook, research metallurgist, Wm. Jessop & Sons, Limited, Sheffield; J. W. Collinson, foundry manager, T. H. Dick & Company, Limited, Hull; G. A. Dyson, foreman pattern maker, Darwins, Limited, Sheffield; H. Gregory, development engineer, David Brown Foundries, Limited, Penistone; J. Moss, core maker, Wallsend Slipway & Engineering Company, Limited; L. Ramsden, assistant foundry manager, T. Broadbent & Sons, Limited, Huddersfield; A. Tummon, representative, British Foundry Units, Limited, Chesterfield.

As Associates (over 21)

M. Martin, iron moulder, Markham & Company, Limited, Chesterfield.

*Transferred from Associate Members.

Pig-iron and Steel Production in Great Britain

The following particulars of pig-iron and steel production in Great Britain have been extracted from the Statistical Bulletin for January, 1948, issued by the British Iron and Steel Federation. Table I gives the production of pig-iron and ferro-alloys in December, with the number of furnaces in blast at the end of the month; Table II, production of steel ingots and castings in December, and Table III, deliveries of non-alloy and alloy finished steel. Table IV summarises steel industry activities during six months ended December, 1947.

TABLE I.—*Weekly Average Production of Pig-iron and Blast-furnace Ferro-alloys, December*, 1947. (*Thousands of Tons.*)

District.	Furnaces in blast, 3.1.48.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derby, Leics., Notts., Northants, and Essex	25	—	13.3	23.3	1.2	—	37.8
Lancs. (excl. N.W. Coast), Denbigh, Flints. and Ches. / Yorkshire (incl. Sheffield, excl. N.E. Coast)	6	—	6.6	—	—	1.4	8.0
Lincolnshire	13	—	21.7	—	—	—	21.7
North-East Coast	25	6.9	34.3	0.4	—	1.4	43.0
Scotland	9	0.7	8.7	2.3	—	—	11.7
Staffs., Shrops., Worcs., and Warwick	8	—	6.2	1.2	0.1	—	7.5
S. Wales and Monmouthshire	7	2.6	18.7	—	—	—	21.3
North-West Coast	7	13.0	—	0.1	—	0.5	13.6
Total	100	23.2	109.5	27.3	1.3	3.3	164.6*
November, 1947	98	24.9	109.3	27.1	1.1	3.5	165.9
December, 1946	99	22.2	101.8	24.4	1.7	3.1	153.2

TABLE III.—*Weekly Average Deliveries of Non-alloy and Alloy Finished Steels.* (*Thousands of Tons.*)

Product.	1946.	1947 (53 weeks).	1946.	1947.	
			Dec.	Nov.	Dec.*
Non-alloy steel :—					
Heavy rails and sleepers	9.0	7.6	7.6	7.9	7.7
Heavy and medium plates	30.9	31.6	29.4	35.9	31.6
Other heavy steel products	31.9	31.7	29.3	34.1	32.5
Light rolled products (excl. wire rods and alloy-steel bars)	48.9	49.8	46.2	54.5	49.9
Ferro-concrete bars	3.2	3.2	2.4	3.7	3.9
Cold-rolled strip	4.2	4.6	4.1	4.9	4.3
Bright-steel bars	4.5	4.8	4.4	6.1	4.8
Sheets, coated and uncoated	22.4	24.3	20.6	26.7	25.3
Tin, terne and black-plate	10.4	12.1	11.7	13.3	11.9
Tubes and pipes	14.0	13.2	13.7	15.2	13.6
Steel wire	11.8	10.8	10.9	12.1	10.5
Tyres, wheels and axles	3.4	3.5	3.5	3.5	3.7
Forgings	4.9	5.0	5.0	6.4	5.5
Castings	2.9	3.0	2.9	3.5	3.3
Total	202.4	205.2	191.7	227.8	208.5
Alloy steel‡ :—					
Plates	0.3	—	0.1	—	0.1
Tubes and pipes	0.2	0.3	0.4	0.5	0.4
Bars, sheets, strip and wire	2.9	3.7	3.2	4.3	4.1
Forgings	1.6	1.8	1.7	2.0	2.2
Castings	0.6	0.6	0.5	0.8	0.7
Total	5.6	6.4	5.9	7.6	7.5
Total U.K. production†	208.0	211.6	197.6	235.4	216.0
Less Intra-industry conversion	16.4	17.9	11.8	25.1	22.3
Total U.K. deliveries	191.6	193.7	185.8	210.3	193.7
Add Deliveries of imported finished steel	—	2.3	—	3.8	2.5
Total deliveries of finished steel	191.6	196.0	185.8	214.1	196.2

† Includes finished steel made from imported ingots and semi-finished steel. ‡ Excludes high-speed steel.

TABLE II.—*Weekly Average Production of Steel Ingots and Castings in December*, 1947. (*Thousands of Tons.*)

District.	Open-hearth.		Bessemer.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derby, Leics., Notts., Northants, and Essex	—	—	(Basic) 9.5	1.2	0.2	10.4	0.5	10.9
Lancs. (excl. N.W. Coast), Denbigh, Flints., and Ches. / Yorkshire (excl. N.E. Coast and Sheffield)	0.8	20.8	—	0.4	0.4	21.6	0.8	22.4
Lincolnshire	—	21.8	—	—	0.1	21.8	0.1	21.9
North-East Coast	1.8	52.5	—	0.6	0.4	54.1	1.2	55.3
Scotland	4.5	24.3	—	1.3	0.6	29.2	1.5	30.7
Staffs., Shrops., Worcs., and Warwick	—	10.9	—	0.6	0.6	10.9	1.2	12.1
S. Wales and Monmouthshire	8.4	37.8	(Basic) 4.9	0.8	0.1	51.7	0.3	52.0
Sheffield (incl. small tonnage in Manchester)	7.3	17.2	—	6.2	0.6	29.9	1.4	31.3
North-West Coast	0.4	2.2	(Acid) 4.0	—	—	6.5	0.1	6.6
Total	23.2	187.5	18.4	11.1	3.0	236.1	7.1	243.2*
November, 1947	24.8	214.2	17.3	12.8	3.5	264.6	8.0	272.6
December, 1946	23.9	181.9	17.7	9.8	3.0	229.6	6.7	236.3

*Five weeks.

(*Continued at foot of facing page.*)

Threat to Motor Manufacturers

Success in Export Drive as the Test

The possibility of some motor-car manufacturers having to be diverted to other work was referred to by Mr. G. R. Strauss, Minister of Supply, at Birmingham, last week. The "Big Six" in the industry, which represented 90 per cent. of the total car production, were safe so far as steel supplies were concerned, but the remaining 10 per cent. were threatened either with extinction or diversion to another trade. Mr. Strauss said that the 10 per cent., which comprised the specialist manufacturers, would have to export 75 per cent. of their output or an agreed proportion or turn to other light engineering. The Government wanted to interpret its export policy for the industry with flexibility and common sense. Most of the firms in the industry would meet the new quota and meet it handsomely; some were exceeding it already. It was hoped that any firms which failed to reach their quota would turn to the manufacture of light engineering goods urgently needed.

The Minister said he could not ignore the export performance of firms in allocating steel to them. Materials must go to the firms which could export and did. And that meant that those which did not could not have them. "I ask you to consider this problem in its true proportions," he said, "and remember that the number of firms likely to be affected will be small and employ comparatively few people, and that the dislocation will be insignificant compared to the almost daily similar occurrences in the hurly-burly of industrial boom and slump, attrition and decay which characterised the pre-war years."

Mr. Strauss emphasised that the Government was prepared to do everything reasonable to help these firms to help themselves. "We realise fully," he said, that it would be unreasonable to expect a firm which has in the past only exported 30 per cent. of its products to raise its exports overnight to 75 per cent. If we should find that for one firm we are justified in naming a specific figure in monetary value as the export quota instead of a certain percentage of production, we shall do so. Or where the firm's effort to meet its export target has not yet borne fruit but it has excellent prospects of succeeding we shall not cut its allotment of steel because it does not reach the target immediately. We shall give it reasonable time. But we cannot give what we haven't got, and time as well as steel is one of the things that we are gravely short of."

The Minister of Supply later met, in private, members of the Midland group of the Engineering Industries Association. The Association afterwards expressed satisfaction at the answers he had given to questions about the manufacture and supply of steel. It had full confidence in the steps being taken.

Value of Operational Research

Reliable Data for Managements

A gathering of more than 1,000 industrialists, trade-union representatives, scientists and others was addressed recently by Sir Edward Appleton, F.R.S., secretary of the Department of Scientific and Industrial Research, on the subject of "Science and the Progress of Industry." The meeting was arranged by the Scottish Council (Development and Industry) and was held at the Royal Technical College, Glasgow. Sir Edward said that he believed that the first task of any country which desired to develop science as an aid to industrial progress was to foster fundamental research in its universities and technical colleges, for it was usually there that the really revolutionary industrial advances had their origin.

Referring to current research, the speaker said that, while it would be a short-sighted policy to drop longer range research entirely, nevertheless the present urgent need for doing everything possible to increase industrial efficiency had caused most of the research associations to concentrate their main effort, for the time being, on shorter-range work and on the dissemination of existing knowledge. As a means of achieving an immediate increase in productivity, many of them had also engaged for some time in what was called during the war "operational research." In industry that meant getting a quantitative estimate of how the efficiency of industrial operations depended on various factors. In that way management could be provided with reliable data on which to base decisions relating to production. Studies of this kind already made in some branches of industry had led to increases in output. The Refractories Research Association and the Iron and Steel Research Association had taken a prominent part in work of this kind.

PIG-IRON AND STEEL PRODUCTION IN GREAT BRITAIN (*Continued from previous page.*)

TABLE IV.—*General Summary of Pig-iron and Steel Production.* (*Weekly Averages in Thousands of Tons.*)

Period.	Iron-ore output.	Imported ore consumed.	Coke receipts by blast-furnace owners.	Output of pig-iron and ferro-alloys.	Scrap used in steel-making.	Steel (incl. alloy).			Steel stocks.†
						Imports.	Output of ingots and castings.	Deliveries of finished steel.	
1946	234.1	115.4	169.2	149.3	147.0	8.3	244.1	191.6	1,223.9
1947 (53 weeks) ..	209.2	129.9	165.1	146.9	145.2	8.0	240.1	196.0	1,067.5
July* ..	209.7	123.6	166.4	143.5	128.9	7.1	211.7	183.1	855.2
August ..	206.8	127.6	164.8	147.2	138.7	5.5	234.2	177.6	816.1
September ..	229.2	129.6	162.7	150.1	161.5	8.0	266.1	204.8	800.4
October* ..	226.3	144.5	174.6	160.6	166.4	5.1	275.3	209.7	782.0
November ..	225.0	153.5	185.6	165.9	164.2	8.3	272.6	214.1	789.2
December *	223.6	149.2	188.2	164.6	144.9	5.8	243.2	196.2	775.0

* Five weeks. † Stocks at the beginning of the years and months shown.

New Trade Marks

The following applications to register trade marks appear in the "Trade Marks Journal":—

"SINTALOY"—Common metal alloys, tools, etc. TOM TIMPERLEY, The Bungalow, Oldfield Road, Stanniington, near Sheffield.

"CINTEL" (DEVICE)—Industrial scientific instruments. CINEMA-TELEVISION, LIMITED, Worsley Bridge Road, Lower Sydenham, London, S.E.26.

"SCHORI"—Shot-blasting machines, spray guns, etc. SCHORI METALLISING PROCESS, LIMITED, Brent Crescent, North Circular Road, London, N.W.10.

"ISAAC MERRITT SINGER"—Electric flatirons. SINGER MANUFACTURING COMPANY, c/o Cruikshank & Fairweather, 29, St. Vincent Place, Glasgow.

FISH DEVICE—Welding and metal-cutting machines, etc. UNDER-WATER CUTTERS, LIMITED, Ormonde House, 26-27, St. James's Street, London, S.W.1.

"KLEXIT"—Electrically-operated vacuum cleaning apparatus. THE WELL FIRE & FOUNDRY COMPANY, LIMITED, 15, Berners Street, London, W.1.

ANVIL BRAND (DEVICE)—Small metal domestic utensils and containers. CATTELL BROS. (METAL PRODUCTS), Silver Nook, Noak Hill, Billericay, Essex.

"VIRITE"—Wires (insulated) and cables for electric transmission systems. EDISON SWAN CABLES, LIMITED, 155, Charing Cross Road, London, W.C.2.

"PRIMON" — Machine-belt bindings, engineering goods, etc. PRIMON ENGINEERING COMPANY, LIMITED, 270, Old Brompton Road, London, S.W.5.

"NAUTILUS" (SHELL DEVICE)—Small domestic utensils. YEOVIL SHEET METAL COMPANY, LIMITED, Nautilus Works, Damper Street, Reckleford, Yeovil.

"CO-Z-AIR"—Radiators. HENRY J. MORTON ASSOCIATES, c/o Forrester Ketley & Company, Jessel Chambers, 88-90, Chancery Lane, London, W.C.2.

"SILVEX"—Electric conduits and switchgear for industrial purposes. SIMPLEX ELECTRIC COMPANY, LIMITED, Broadwell Road, Oldbury, near Birmingham.

"METOLUK" (DEVICE)—Wringing machines, dairy and agricultural implements, etc. SHORT & HARLAND, LIMITED, Airport Road, Queen's Island, Belfast.

"APEX HOLLOWARE" (TRIANGLE DEVICE)—Hollowware. LAMB, HINGLEY & COMPANY, LIMITED, Stour Works, Railway Street, Lye, Stourbridge, Worcs.

"HALLAMAX"—Unwrought and partly wrought common metals. HALLAMSHIRE STEEL & FILE COMPANY, LIMITED, Hallamshire Works, Bardwell Road, Sheffield.

"FARWIN"—Pumps driven by internal combustion engines. HOWARD FARROW, LIMITED, Bank Buildings, Russell Parade, Golders Green Road, London, N.W.11.

"EDILON"—Weighing and measuring apparatus and instruments. EDITH JACKSON LONSDALE and MAUREEN LONSDALE, Greycot, Bollinway, Hale, Altrincham, Ches.

FLOWER DEVICE—Weighing and measuring apparatus, etc. ROSEDALE ASSOCIATED MANUFACTURERS, LIMITED, Central House, 34-36, Oxford Street, London, W.1.

"RAPIER"—Scientific and measuring apparatus. ANGLO SCOTTISH TRADING COMPANY, LIMITED, Northumberland House, Northumberland Street, Newcastle-upon-Tyne.

"WASP"—Internal combustion engines. UNITED AIRCRAFT CORPORATION, c/o Stevens, Langner, Parry & Rollinson, 5-9, Quality Court, Chancery Lane, London, W.C.2.

"CINSEAL"—Unwrought or partly-wrought common metal alloys. STANDARD TELEPHONES & CABLES, LIMITED, Connaught House, 63, Aldwych, London, W.C.2.

"MECABRAIN"—Electric apparatus for controlling a predetermined sequence of operations. JEAN GUICHARD, c/o A. A. Thornton & Company, Napier House 24-27, High Holborn, London, W.C.1.

New Patents

The following list of Patent Specifications accepted has been taken from the "Official Journal (Patents)." Printed copies of the full Specifications are obtainable from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. each. The numbers given are those under which the Specifications will be printed, and all subsequent proceedings will be taken.

593,715 POLLOCK, S. A. Moulds for casting metal.

593,762-3 SOC. ANON. DE GALVANOSTEGIE ALMETA. Processes for covering the surface of aluminium or aluminium-alloy articles with an adherent metallic coating.

593,822 RICHARDS, L. S. De-oxidising or like agents for foundry use.

593,861 GODFREY, R. A. E. Solid-fuel heating stoves.

593,865 BLOXHAM, H. P. (legal representative of Tomlinson, G. A.). Instruments for recording surface roughness.

593,899 STEVENS, A. H., and CAMPBELL, C. A. (Solventol Chemical Products, Inc.). Cleaning metal parts and baths for use in connection therewith.

Parliamentary

Steel for Shipbuilding

MR. W. J. EDWARDS, Civil Lord of the Admiralty, stated in reply to a question that no allocations of steel for the shipyards had yet been made for the second half of 1948, but if the allocations for shipbuilding and ship-repairing remained at the same level as for the first half of 1948, the total allocations for the year would be 5.5 per cent. less than the total allocations for 1946, 7 per cent. more than the total allocations for 1947, 17 per cent. less than the total deliveries of steel in 1946 and 14.6 per cent. less than the total deliveries of steel in 1947.

Obituary

MR. JOHN WILD, who died on February 13, was principal director of Condor Ironworks, Limited, Oldham. He was 75.

MR. ALEXANDER COLVILLE BROWN, a director of Brown & Adam (Engineers), Limited, Pollokshaw, Glasgow, died on February 13.

MR. JOHN ALEXANDER ANDERSON, late of Henry Every & Company, Limited, manufacturers of iron cements, etc., of Glasgow, died on February 15.

MR. JAMES CLIFTON LAURIER, late manager of the Bellow Machine Company, Limited, clothiers' engineers and ironfounders, of Leeds, died recently.

MR. WILLIAM ALEXANDER YOUNG, who died on February 12, at the age of 77, was formerly with Babcock & Wilcox, Limited, boilermakers, etc., of Renfrew, for over 50 years.

MR. PATRICK JOSEPH FLAHERTY, who died recently, had been a director of the Glacier Metal Company, Limited, since 1939. He was an American citizen and was president of the Johnson Bronze Company, Pennsylvania.

MR. SAMUEL STAFFORD HALE, governing director of Hale Bros., Limited, manufacturers of drill steels, tools, etc., of Sheffield, and of Hale & Pennington, Limited, English and Swedish iron and steel stockholders, of Sheffield, died on February 14.

COMM. CHARLES MONTAGU FOOT, who died recently, left the Navy in 1907 to join Vickers, Limited. In 1931 he went to the Stocksbridge Works of Samuel Fox & Company, Limited, and in 1935 he joined Thos. Firth & John Brown, Limited, as a steel inspector. He retired four years ago. Comm. Foot was 74 years of age.

MR. NORMAN HART, a director of Kerrys (Gt. Britain), Limited, machinery and welding-plant merchants, of Stratford, London, E.15, has died at the age of 88. He was the founder of Constable Hart & Company, Limited, tar-macadam manufacturers and public works contractors, of Caxton Street, London, S.W.1, of which company he was a director.

MR. EDWARD BURTON BURTON, chairman of J. Brockhouse & Company, Limited, manufacturers of springs and axles, etc., of West Bromwich, has died suddenly at Leamington. He was appointed a director of the company in 1927 and elected chairman in 1944. Mr. Burton was chairman also of the subsidiary undertakings of the group and was a director of a number of other companies, including Albion Drop Forgings Company, Limited.

MR. CHARLES M. DONCASTER, chairman of Daniel Doncaster & Sons, Limited, steelmakers, etc., of Sheffield, died on February 14, aged 68. His death occurred within a few weeks of that of his cousin, Mr. J. H. Doncaster, whom he had succeeded as chairman of the company. Mr. C. M. Doncaster was a great-grandson of the founder of the business, which was established in 1776. He underwent a serious operation about two years ago and had not taken a very active part in business affairs since.

MR. GEORGE ANDERSON SHORT, who died at Hexham on February 12, was chairman of Short Bros., Limited, shipbuilders, of Pallion, Sunderland. He had been associated with his two brothers, Thomas and Harry, as a director of the company for many years, and succeeded to the chairmanship on the death of his elder brother Thomas three years ago. He was a past-chairman of the Wear Shipbuilders' Association. Since 1933, he had been a member of the Worshipful Company of Shipwrights. Mr. Short was 61 years of age.

SIR GEORGE A. MITCHELL, a prominent figure in the industrial and public life of Glasgow and the West of Scotland for many years, died on February 16. He had a lifelong association with the iron and steel and coal industries. Born in Hamilton in 1860 and educated at Lenzie Acadamy and Glasgow University, he took over the management of his father's business, Kerr & Mitchell, colliery owners, Wishaw, and carried it on until the lease of Glenclelland Colliery was given up. Sir George was a director and a former chairman of the Lochgelly Iron & Coal Company, Limited, and a director of their associated undertakings. He was for some years on the board of Clydesdale Bank and of Stewarts and Lloyds, Limited, and was a director of Jas. Dougall & Sons, Limited, manufacturers of refractories, etc. A member of Glasgow Chamber of Commerce since 1892, he was president in 1923 and 1924. In 1928 he was elected president of the Association of British Chambers of Commerce. In 1930 Sir George was chairman of the Committee appointed by the President of the Board of Trade to consider the economic factors involved in the disposal of old ships and their replacement by new vessels. He was knighted in 1935.

Tyne Shipyards, "Grand Record"

Last Year's Achievements

Speaking at a dinner held in Newcastle-upon-Tyne recently in honour of Sir Mark Hodgson, on the occasion of his retirement from the position of general secretary of the United Society of Boilermakers and Iron and Steel Shipbuilders, Viscount Hall, First Lord of the Admiralty, referred to Tyneside's position as a great shipbuilding and shiprepairing area. He said that during the last calendar year 34 ships, totalling 175,000 tons, had been completed there, no less than one-fifth of the total output of merchant shipbuilding for the whole industry in that period. There were now 50 ships, totalling 360,000 tons, at present on the slips or fitting out. Repair work during the same period had amounted to 4½ million tons, and a further ½ million tons of repair work was now in hand. The First Lord said this was truly a grand record.

Paying tribute to the "long and distinguished career" of Sir Mark Hodgson, Viscount Hall said that it had been his great pleasure to have been very closely associated with Sir Mark, and he had always admired his great ability, versatility and courage. He had served his fellows, the community in which he lived and the nation with great credit and distinction.

News in Brief

EWART INDUSTRIES, LIMITED, metal workers, of Letchworth, has changed its name to Ewart & Son, Limited.

THE NAME OF West Coast Haematite Ingot Moulds, Limited, Manchester, has been changed to West Coast Trading Company, Limited.

THE ADDRESS OF I.T.D., Limited, is now Stacatruc House, 142, Sloane Street, London, S.W.1 (telephone: Sloane 3546, 8528 and 3167).

THE NAME OF Sussex Engineers & Manufacturers Association, Limited, Brighton, has been changed to Federation of Sussex Industries, Limited.

APPLICATION IS BEING MADE for permission to deal on the Manchester Stock Exchange in the 2s. shares of the Manchester Tinning Company, Limited.

THE MINISTRY OF SUPPLY has announced further interim allocations of tin metal, totalling 495 tons, by the Combined Tin Committee for the first half of 1948.

AN APPLICATION is to be made for a quotation for the 2s. ordinary shares of Dewhurst & Partner, Limited, manufacturers of automatic electric starters and magnetic brakes, etc., of Hounslow.

SWAN, HUNTER & WIGHAM RICHARDSON, LIMITED, Wallsend, is reported to have received an order for a motor tanker of 24,000 tons dw. for Norwegian owners, for delivery after 1950. The propelling machinery will consist of Doxford oil engines.

SEVEN EMPLOYEES who have completed 25 or more years' service with W. H. Dorman & Company, Limited, manufacturing engineers and ironfounders, of Stafford, have received long-service certificates. The presentations were made by Mr. H. F. Smallwood, chairman of the company.

THE GOVERNMENT has given its approval to an agreement recently signed between Thorn Electrical Industries, Limited, Judd Street, London, W.C.1, and Sylvania Electric Products, Inc., New York, providing for the interchange of technical information in the manufacture of electric lamps and lighting equipment.

THE DIRECTORS OF Grayson, Rollo & Clover Docks, Limited, Liverpool, recommend that the sum of £52,550 of the company's reserves should be capitalised and used in payment in full of 420,400 of the unissued shares of 2s 6d. each in the capital of the company to be distributed among shareholders on the register on March 10, as a capital bonus in the proportion of one new share for every two shares held.

THE WINSOR ENGINEERING COMPANY, LIMITED, Glasgow, and the Carrier Engineering Company, Limited, Buckingham Gate, London, S.W.1, have entered into an agreement whereby the former company has been granted the rights to manufacture and sell in the United Kingdom Carrier air-conditioning equipment for marine use under the designs and patents of the Carrier Company. The two companies will act in close technical collaboration, and the equipment will carry the joint name Carrier-Winsor.

Contracts Open

The dates given are the latest on which tenders will be accepted. The address is that from which forms of tender may be obtained.

Brierley Hill, March 3—Manhole covers, gulley grates, etc., for the Urban District Council. The Engineer and Surveyor, Hawbush House, Brierley Hill.

Coventry, March 12—Iron castings, etc., for the City Council. The City Engineer and Surveyor, Council House, Coventry.

Dewsbury, March 3—Iron castings, steel reinforcements, etc., for the Corporation. The Borough Engineer, Municipal Buildings, Halifax Road, Dewsbury.

Dewsbury, March 31—Cast-iron pipes and specials; valves and hydrants; water meters; and cast-iron surface boxes, for the Corporation Water Department. The Water Engineer, 10, Church Street, Dewsbury.

Haslingden, March 10—Iron castings, etc., for the Borough Council. Mr. R. Taylor, borough surveyor, Municipal Offices, Haslingden.

Maesteg, March 13—Iron castings, etc., for the Urban District Council. Mr. E. Davies, surveyor to the council, Council Offices, Maesteg.

Pembroke, March 16—Provision and laying of approx. 9¼ miles of 3-in. spun-iron pipes, etc., for the Rural District Council. J. Owen Parry & Lewis, consulting engineers, Ammanford. (Fee £5 5s., returnable.)

Southport, March 8—Supply of 1,000 galvanised sanitary dustbins and covers, for the County Council. The Borough Engineer, Town Hall, Southport.

Widnes, March 8—Castings, for the Corporation. Mr. J. Holt, borough engineer and surveyor, Town Hall, Widnes.

German Scrap Resources

The U.S. mission has now completed its survey of the scrap iron and steel situation in the Anglo-American zone of Germany. Following a meeting between the mission and American Military Government officials it was stated that, in view of the world-wide demand for scrap, now was an appropriate time to negotiate scrap export sales from Germany, as large reserves were available and huge stocks remained to be processed.

Prices and Profits

The Federation of British Industries has accepted an invitation from the Chancellor of the Exchequer to study the question of making voluntary proposals "to obtain a reduction of prices and to face the consequences of this on the level of profits." A committee has been appointed and the Association of British Chambers of Commerce and the National Union of Manufacturers have been asked to collaborate.

Personal

MR. G. M. FOTHERINGHAM has been appointed a director of Pearson & Dorman, Long, Limited.

MR. ROY MITCHELL, general manager of Mitchell Engineering, Limited, Peterborough, is now on a business visit to Finland.

MR. J. G. R. WOODVINE, managing director of Sentinel (Shrewsbury), Limited, has been appointed a director of Metal Industries, Limited.

MR. F. L. S. GUNNER has been appointed a director of G. Hopkins & Sons, Limited, brewers' and bottlers' engineers, etc., of Highbury, London, N.7.

SIR GEORGE JESSEL has accepted the chairmanship of Parkinson & Cowan, Limited. He succeeds LT.-COL. HAROLD W. WOODALL, who has retired owing to ill-health.

MR. CHARLES SKELTON, who is 85 years of age, has retired from the staff of the Eastwell Iron Ore Company, Eastwell, Melton Mowbray, Leics, after 70 years' service.

SIR CHARLES G. RENOLD, chairman of Renold & Coventry Chain Company, Limited, has been appointed hon. treasurer of the Manchester Joint Industrial Council.

MR. S. J. BELLAMY, who joined the staff of Peter Brotherhood, Limited, engineers and ironfounders, of Peterborough, 20 years ago, has been appointed a director of the company.

MAJOR F. BENTLEY has been appointed acting manager of the Manchester branch office of the Atlas Diesel Company, Limited, Wembley. The branch, which is at City Road, Gaythorn, Manchester, will deal mainly with the sale of the compressed-air products of the company.

MR. H. C. H. BATHURST, joint managing director of John Lysaght, Limited, MR. E. C. LYSAGHT and MR. A. MACBETH, directors of Guest, Keen & Nettlefolds, Limited, have left Australia for this country in the Orion. They have been engaged in a survey of Australia's sheet-steel production.

MR. J. P. HAMILL has been appointed managing director of the newly formed company Richard Crittall Marine, Limited, a subsidiary of the Richard Crittall group. MR. J. L. MUSGRAVE is the chairman and other members of the board are:—MR. A. E. HINDS (vice-chairman), MR. W. A. MCPHAIL, MR. R. A. PRICE, MR. W. C. ROBINSON, MR. O. S. SHARRATT and MR. F. S. TOWLE.

MR. ALEXANDER BEHR has been appointed export superintendent of Mono Pumps, Limited. For many years he occupied a similar position with Petters, Limited, and until recently was with Tangyes, Limited. Mr. Behr will travel widely on behalf of Mono Pumps, Limited, which is now able to give more satisfactory delivery dates for export orders for its positive rotary self-priming pumps.

MR. LAUNCELOT E. SMITH is to retire from the chairmanship of Smith's Dock Company, Limited, North Shields and South Bank, a position he has occupied for 34 years. Mr. Launcelot Smith, who is 80, relinquished the position of joint managing director of the company, which he held with Sir Tristram Edwards, in September, 1945. He is a past-president of the North East Coast Institution of Engineers and Shipbuilders.

MR. R. H. S. TURNER has been appointed superintendent of the plant department of Metropolitan-Vickers Electrical Company, Limited, in succession to the late Mr. F. A. Pucknell. Mr. Turner joined the company as a college apprentice in 1929. From 1938 until the end of the war he was engaged on the development and manufacture of automatic pilots, becoming successively assistant superintendent of the meter extension department and assistant superintendent in charge of the company's Sandon Works at Eccles. In 1945 he was appointed assistant superintendent of the plant department.

Wills

BROWN, ROBERT, of Belfast, ironfounder and engineer £16,491

TAILBY, E. M., a director of the Gloucester Shipyard Company, Limited, and other companies £19,437

GARDNER, E. W. L., a director of L. Gardner & Sons, Limited, oil-engine manufacturers, of Patricroft, Manchester £224,187

LOE, J. L., of Cookridge, Yorks, for many years representative in North-Eastern England of E. Boydell & Company, Limited, engineers, of Manchester £6,580

CLARKE, G. W., a specialist on gear and spline grinding with A. C. Wickman, Limited, Coventry, and previously works superintendent with the Gear Grinding Company, Limited, Birmingham... ... £4,608

Gazette

FREDK. WILLIAMS GUNMAKERS, LIMITED, is being wound up voluntarily. Mr. C. H. Hills, 147, Corporation Street, Birmingham, is the liquidator.

YATES IMPROVED RAIL ANCHOR COMPANY, LIMITED, is being wound up voluntarily. Mr. R. J. Fisk, 31, Copthall Avenue, London, E.C.2, is the liquidator.

THE PARTNERSHIP BETWEEN Henry Norman Nelson, Alfred Ernest Mills and John Woodhouse, carrying on business as general engineers at 15, Pulcroft Road, Hessle, and Broomfleet Brough, Yorks, under the style of Light Metals Products Company, has been dissolved. Debts will be received and paid by H. N. Nelson and A. E. Mills, who continue.

THE PARTNERSHIP BETWEEN James Wright, Frank Squire Mitchell, Arthur Peel and Harold Reason, carrying on business as leather trade engineers at 123, Buslingthorpe Lane and Carr Mills, Buslingthorpe Lane, Leeds, under the style of "James Wright," has been dissolved. Debts will be received and paid by J. Wright, F. S. Mitchell and H. Reason, who continue.

THE COMPANIES REGISTRATION OFFICE gives notice that the undermentioned companies have been struck off the register and are thereby dissolved:—Belmonte Tin, Limited; Copper Pipe Lines, Limited; Ginsberg Metal Company, Limited; Heald Machine Tool Company, Limited; London Electronic Developments, Limited; and the Super-Chrome Plating Company, Limited.

Company News

(Figures for previous year in brackets.)

Thos. W. Ward—Interim dividend of 5% (3¼%).

Metal Industries—Interim dividend of 3% (same).

Clarke, Chapman & Company—Dividend of 12½% (same).

Richard Johnson, Clapham & Morris—Interim dividend of 5% (same).

H. & J. Hill (Willenhall)—Final dividend of 35% (15%), making 50% (30%).

United Steel Companies—Interim dividend on the ordinary shares of 2½% (same).

Webley & Scott—Dividend of 15% (same) and bonus of 5% (nil), making 20% (15%).

Davies & Metcalfe—Final dividend of 12% (8%), making 15% (11%), payable in sterling.

Monotype Corporation—Final dividend of 5% (6%) and bonus of 5% (same), making 15% (same).

Metropolitan Gas Meters—Net profit to September 30, 1947, £17,745 (£18,993); to tax, £8,214 (£7,414); general reserve, £5,000 (£7,500); dividend of 15% (same); forward, £1,915 (£2,314).

Tomlinsons (Rochdale)—Net profit for the year ended June 30, £8,677 (£7,554); to general reserve, £5,000; dividend of 10% on the ordinary shares (same); forward, after preference dividend, £5,788 (£4,482).

Zinc Investments—Income for the year ended June 30, 1947, £12,389 (£12,485); to directors' fees, audit fees, etc., £512 (£513); general expenses, £498 (£479); tax, £150 (£145); net profit, £11,228 (£11,348); dividends of 4½% (5%); forward, £917 (£938).

International Combustion—Trading profit to September 30, 1947, £250,620 (£257,812); other income, £44,849 (£15,522); to directors' fees, £4,338 (£4,500); depreciation, £31,108 (£27,567); investment reserve, nil (£7,500); tax, £170,367 (£144,718); net profit, £89,656 (£89,049); final dividend of 27½% (22½%) making 37½% (32½%); bonus, nil (5%); forward, £124,958 (£112,789).

Anti-Attrition Metal Company—Manufacturing profit for the year to July 31, 1947, £41,152 (loss £13,599); balance, with £217 interest received and after directors' fees, £39,832 (debit £15,068); to superannuation trustees, £500 (same); taxation, £1,000 (£16,000 from taxation no longer required); dividend reserve account, £5,000 (nil); dividend of 10% (7½% on smaller capital); forward, £16,390 (£5,058).

Associated Engineering Holdings—First report for the period from May 15 to September 30, 1947, shows dividends and charges payable by subsidiary companies for the period July 14 to September 30, 1947, less fees and management expenses, £43,154; written off preliminary expenses, £13,104; preference dividend, £1,836; ordinary dividend of 3%, £26,840; forward, £1,374. The company was made public on July 14, 1947.

Smith's Dock Company—Profit to September 30, 1947, £773,385 (£536,397); transfer fees, £27 (£21); to directors' fees, £4,804 (£4,758); special pension contribution, nil (£40,788); depreciation, £90,000 (£60,000); E.P.T. and profits tax, £133,500; income tax, £292,000 (£315,000); net profit, £253,108 (£115,872); to plant improvement reserve, £180,000 (£50,000); dividend of 10% (8%); bonus, nil (2%); forward, £44,529 (£31,921).

Burnell & Company—Trading profit for 1947, £96,636 (£90,718); adjustment in respect of previous year, nil (£16,784); to depreciation, £10,000 (£6,000); directors' fees, £1,300 (£862); taxation, £50,000 (same); net profit, £35,336 (£50,640); participating preference dividend of 7.1842d. per share (3.5773d.); final ordinary dividend of 22½%, making 30% (same); to general reserve, £10,000 (same); staff pensions, etc., nil (£10,000); forward, £65,909 (£58,387 after £1,000 voted to directors).

Benton & Stone—Trading profit and investment income for the year to August 27, 1947, £74,209 (£60,786); to policy premium, £645 (same); written off plant and machinery, £5,847 (£6,369); directors' fees, £284 (£285); pensions, £4,146 (£4,373); profit, £63,287 (£49,114); to taxation, £34,497 (£27,342); net profit, £28,790 (£21,772); to general reserve £15,000 (£10,000); provident fund, £5,000 (nil); final dividend of 10%, tax free (same), making 15%, tax free (same); forward, £13,107 (£13,690).

Vono—Trading profit for the year to August 31, 1947, after E.P.T. and profits tax, £185,018 (£84,219); dividends receivable from subsidiaries, £25,014 (£65,507); to directors' remuneration and fees, £8,700 (£8,547); depreciation, £23,108 (£5,809); income tax on current year's profits and dividends from subsidiaries, £83,522 (£57,933); general reserve, £35,000 (same); dividend of 45% and bonus of 10%, making 55% (45%); profits tax at 15% (less income tax) on dividends, £5,470; forward, £96,721 (£93,049).

Boulton & Paul—Profit, including dividends from subsidiary companies and settlement of war contracts, for the year ended September 30, 1947, £149,655 (£126,861, including claim for E.P.T. repayment); surplus on sales of fixed assets, £3,167 (£4,624); claim under War Damage Act, 1943, £19,490 (nil); pensions reserve, £4,000 (nil); to director's fee, £500 (same); depreciation, £13,593 (£13,639); taxation, £62,000 (£52,656); net profit, £125,497 (£93,318); to general reserve, £50,000 (nil); pensions reserve, nil (£40,000); dividend of 20% (15%); forward, £40,572 (£25,278).

Experimental Power Plant for Dundee

The North of Scotland Hydro-Electric Board is to erect an experimental power plant suitable for use in conjunction with an atomic pile at Dundee Harbour. At first the plant will be run on oil, and three tanks with a total capacity of 330,000 galls. will be erected at Carolina Port. It will consist of an Escher Wyss closed-cycle gas turbine with a capacity of 15,000 kw. Although of Swiss design, the turbine will be wholly manufactured in Scotland. The new plant replaces a 6,000-kw. steam turbine and is expected to be in working order by the summer of 1950.

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THE STANTON IRONWORKS COMPANY
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Raw Materials Markets

Iron and Steel

The foundry pig-iron position shows no improvement. Supplies remain difficult and, with the low stocks available, foundries have barely sufficient pig-iron to cover current consumption. These difficulties are accentuated by the shortage of scrap, with the result that production is being curtailed. These conditions apply particularly to the light foundry trade, shortage of high-phosphorus iron being acute. Manufacturers of light castings and the general engineering foundries have good order-books, much of the business being for export and P.M.I. requirements. Supplies of medium- and low-phosphorus iron, hematite and refined pig-iron are being taken up by the general engineering foundries when available, but these grades are also in short supply.

Cupola coke is being delivered fairly satisfactorily, while adequate supplies of refractories and limestone have been forthcoming. Ferro-alloys are obtainable within reasonable delivery periods.

All the re-rolling mills could take up a much larger tonnage of semis than they are receiving at present. Outputs of semis from home sources have improved, but the real solution to the supply position lies in increased imports. Instances are reported of re-rollers operating on a part-time basis owing to the shortage of semis. Maximum outputs cannot be achieved by the sheetmakers due to the scarcity of sheet bars.

Strong pressure continues for deliveries of steel joints, sections and plates, and consumers are hoping to obtain good deliveries against their specifications before the revised distribution scheme comes into operation.

Non-ferrous Metals

The reaction on Wall Street and the weakness in many of the U.S. commodities has not unnaturally given rise to suggestions that a fall will occur in the prices of non-ferrous metals, but, on the whole, this seems to be rather unlikely. For one thing, consumption is still very well maintained and, moreover, it must not be forgotten that many, if not all, of those commodities which have suffered a downward reaction had risen to several times their pre-war value and had been the subject of speculative buying to an extent certainly not seen in metals. Lead and zinc have risen more in relation to their pre-war value than the others, but both these metals are in genuinely short supply. Scrap, it is true, has recently reacted from the high levels reached a few weeks ago, but there was no mistaking the strength of the upward movement while it lasted. And it may well be that it will come again in the not far distant future, for the amount of secondary metal available is considerably below the demand. Temporarily, the consumers are holding off because of the uncertain outlook, but business with them is still quite brisk and they can hardly fail to re-enter the market soon. Production of blister copper in January in the United States was 82,516 short tons, against 80,593 tons in the previous month, while the corresponding figures in refined copper were 102,314 tons and 108,816 tons. Stocks of refined copper declined from 74,832 tons at December 31 to 71,533 tons at the end of January, while domestic deliveries, at 118,855 tons, exceeded the December figure by about 5,400 tons. There is, it will be noticed, a big gap between domestic production of blister copper at 82,516 tons and deliveries to domestic consumers at 118,855 tons.

Pending some news about what is to happen as a result of the British Government's invitation to industry to lower prices and limit profits, the future is obscure, and there is a marked tendency to adopt a cautious attitude in buying and selling. At the same time, it is recognised that in these uncertain times metals are a fairly good thing to hold, but the trouble is that values are so inflated that people are rather nervous when they think back to the quotations ruling before the war. Whenever the future comes under discussion, the question usually raised is, what will be the level of prices once the present buying craze has spent itself and trade settles down to a more sober tempo? A figure of £80 for copper has been suggested, but we shall make little progress in estimating until a free market is re-established in London and the producers' valuation is no longer the sole criterion of what constitutes a fair price for metals.

Status of Technical Colleges

The Minister of Education (Mr. George Tomlinson) last week received a deputation from the Parliamentary and Scientific Committee to consider the report on colleges of technology and technological man-power. The report suggested that the major technical colleges could make a substantial contribution towards the country's scientific man-power, and to that end recommended that their status should be raised and better arrangements made to enable them to give degrees in technology.

Mr. Tomlinson expressed sympathy with the point of view put forward and said that in general the views expressed in the report coincided with those of his department. He hoped that useful progress would be made along the lines the Committee desired.

Increases of Capital

Details of increased capital have been announced by the following companies:—

Western Detail Manufacturers, Limited, engineers, etc., of Bristol, increased by £4,850, in £1 ordinary shares, beyond the registered capital of £150.

Lythall's Engineering Company, Limited, 10, Lythall's Lane, Coventry, increased by £5,000, in 100,000 ordinary 1s. shares, beyond the registered capital of £5,000.

Midland Bright Drawn Steel & Engineering Company, Limited, West Bromwich, increased by £150,000, in 1,000,000 ordinary shares of 1s. and 100,000 5½ per cent. cumulative preference shares of £1 each, beyond the registered capital of £50,000.